United States Court of Appeals

FOR THE EIGHTH CIRCUIT

No. 17,540.

CIVIL.

CALMAR, INCORPORATED,
Appellant,

vs.

COOK CHEMICAL COMPANY,
Appellee.

No. 17,541.

CIVIL.

COLGATE-PALMOLIVE COMPANY,
Appellant,

vs.

COOK CHEMICAL COMPANY,
Appellee.

APPEALS FROM THE UNITED STATES DISTRICT COURT FOR THE WESTERN DISTRICT OF MISSOURI.

INDEX

VOLUME OF EXHIBITS

Index to Exhibits

Plaintiff's Exhibits 341

C, (Scoggin Deposition Exhibit 67), Defendant's Circular to Trade, November, 1959 341

E, (Scoggin Deposition Exhibit 13), Application for Scoggin Patent in Suit 347

F, Claim 18 of Scoggin Application Viz-a-Viz Claim 25 (Claim 1 of Patent in Suit) 379
G, Photograph of Large Scale Model of Device of Patent in Suit, Scoggin Patent No. 2,870,943 381
G-1, Photograph of Model (Exhibit G) with Pump Plunger Removed 383
H, Letters Patent No. 2,715,480 to J. G. Livingstone, August 16, 1955 385
I, Letters Patent No. 2,763,402 to J. G. Livingstone, September 18, 1956 390
J, Preliminary Sketch of Bakan 2 Sprayer Parts 396
L, (Scoggin Deposition Exhibit No. 40), Memorandum from Chester M. Turner to Baxter I. Scoggin et al. 397
M, (Scoggin Deposition Exhibit No. 37), Preliminary Sketch of Bakan 2 Sprayer, February 11, 1957 399
P, Drawing of Bakan 1 Sprayer 401
Q, Drawing of Bakan 2 Sprayer 403
S, Drawing of Bakan 3 Sprayer 405
T, Letters Patent No. 2,119,884 to F. W. Lohse, June 7, 1938 407
U, Letters Patent No. 2,586,687 to R. Mellon, February 19, 1952 410
V, Letters Patent No. 2,861,839 to R. Mellon, November 25, 1958 414
Y, Letters Patent No. 2,434,875 to F. M. Turnbull et al., January 20, 1948 419
DD, Defendant's Advertising—Bakan 2 Sprayer 429
EE, Defendant's Advertising—Bakan 2, Modified Sprayer 431
FF, Defendant's Advertising (1961) Omitting Reference to Bakan 2 Sprayer 433
GG, Defendant's Advertising—Bakan 3 Sprayer 438
HH 1-13, Photographs of Physical Exhibits Illustrating Various Packaging Methods 440
II, Summary of Sales in 1958 of Colgate's Insecticide with Sprayer on Side of Bottle 454
JJ, Enlarged Drawing of Livingstone Patent No. 2,751,480 455
KK, Enlarged Drawing of Mellon Patent No. 2,586,687 457
MM, Letters Patent No. 2,844,290 to W. J. Slade, July 22, 1958 459
NN, Letters Patent No. 2,118,222 to O. G. Nilson, May 24, 1938 462
OO, Letters Patent No. 1,447,712 to J. W. Darley, Jr., March 6, 1923 468
PP, Photograph of Large Scale Model of Accused SS40 Sprayer 471
PP-a, Photograph of Large Scale Model of Accused SS40 Sprayer 473
QQ, Drawing of Accused SS40 Sprayer 475
VV, Drawing of SS40 Sprayer 477

YY, (Scoggin Deposition Exhibit No. 27) Drawing of Accused SS40 Sprayer 479
ZZ, Stipulation Concerning Commercial Sprayers 480
AB, Letters Patent No. 3,064,865 to B. I. Scoggin et al., November 20, 1962 496
AC, Excerpts from Scoggin et al. Application 835,680 (Patent No. 3,064,865) 501
AD, Excerpts from Forfeited Scoggin et al. Application No. 789,902 504

Defendant's Exhibits 510
10, Letters Patent No. 2,870,943 (Patent in Suit), to B. I. Scoggin, Jr., January 27, 1959 510
31, Photograph of Austin Window Cleaner with Bakan 3 Sprayer 513
31-A, Photograph of Austin Window Cleaner with Bakan 3 Sprayer-Overcap Removed 514
33, Photograph of Austin Window Cleaner—Earlier Package Without Sprayer 515
35, Summary of Sales by Austin (1957-1962) 516
90, Drawing of Bakan 2 Modified Sprayer 517
94, Chart #1—Fishleigh 519
110, Photomicrograph of Defendant's Exhibit 102 521
112, Photomicrograph of Defendant's Exhibit 104 522
114, Photomicrograph of Defendant's Exhibit 106 523
116, Photomicrograph of Defendant's Exhibit 108 524
118, Drawings Prepared from Defendant's Exhibits 110, 112, 114 and 116 525
120, Chart #2—Fishleigh 527
121, Letters Patent No. 2,956,509 to R. C. Cooprider and Douglas F. Corsette, October 18, 1960 529
150, Sketch of Boot for Sprayer 537
160, Memorandum by Davis (Calmar)—March, 1958 538
162, Memorandum by Davis (Calmar)—May, 1958 540
198, Notes on Calmar Development Committee Meeting, December 18, 1957 541
200, Memorandum—Wise to Department Heads, November 20, 1958 544
202, Memorandum by Wise to W. H. Harnage, March 31, 1958 550
210, Photograph of Scoggin Experimental Closure Cap 551
224, Chart #3, Fishleigh 553

	Original	Print
Proceedings in the United States Court of Appeals for the Eighth Circuit	555	555
Opinion, Mehaffy, J.	555	555
Judgment	565	564
Petition of appellants for rehearing en banc under this Court's Rule 15	566	565
Order denying petition of appellants for rehearing en banc	578	577
Order denying motion of appellants to recall and stay issuance of mandate	579	577
Clerk's certificate	580	578
Orders allowing certiorari	581	579

[1015] PLAINTIFF'S EXHIBIT C.

BAKAN PLASTICS

Division of Cook Chemical Company

P. O. Box 78 2500 Summit Kansas City 41, Missouri

Phone VIctor 2-8092

November, 1959

(Scoggin Deposition Exhibit No. 67. 4/12/60)

Re: Re-designed and Re-engineered Model 2 Leak Proof Sprayer

I am sure you will be interested in seeing our new leak proof sprayer equipped with a new cap and collar. This new cap and collar has the following advantages:

1. The cover cap can be tightened to a uniform torque at our plant—this eliminates extra cost for our customers.
2. This new cover cap is designed so that it makes a perfect seal on the collar—which the old one would not do.
3. This cover cap has more eye appeal—than the old one. This unit can be equipped with a cap 24mm or larger. We recommend that the customers should use a cap 26 mm or larger, because the O. D. of the cover cap is larger than the O. D. on a 24mm, as an example. In other words, if the base cap has a smaller O. D. than the cover cap, it makes it impossible to tighten the metal cap unless they have a special capper.

We are now in production and all sprayers manufactured from now on will be equipped with this new cap and collar. Our engineering department is also re-designing and re-engineering the head mold, the orifice mold, and the plunger mold and we expect to have this work done by January 1st—possibly sooner. With this new development, we will be able to furnish you a completely leak proof sprayer, which will eliminate any leakage back into the cap.

[1016] We are mailing you the samples now, so that you can see how we are improving this unit, which will be a real help to you. I might also add that this sprayer is covered by patent number 2,870,943.

Of course, our sales representative, the
will be glad to answer any questions you may have regarding this unit.

Yours very truly,
BAKAN PLASTICS
/s/ Jim Groebe
Jim Groebe
Sr. Vice President

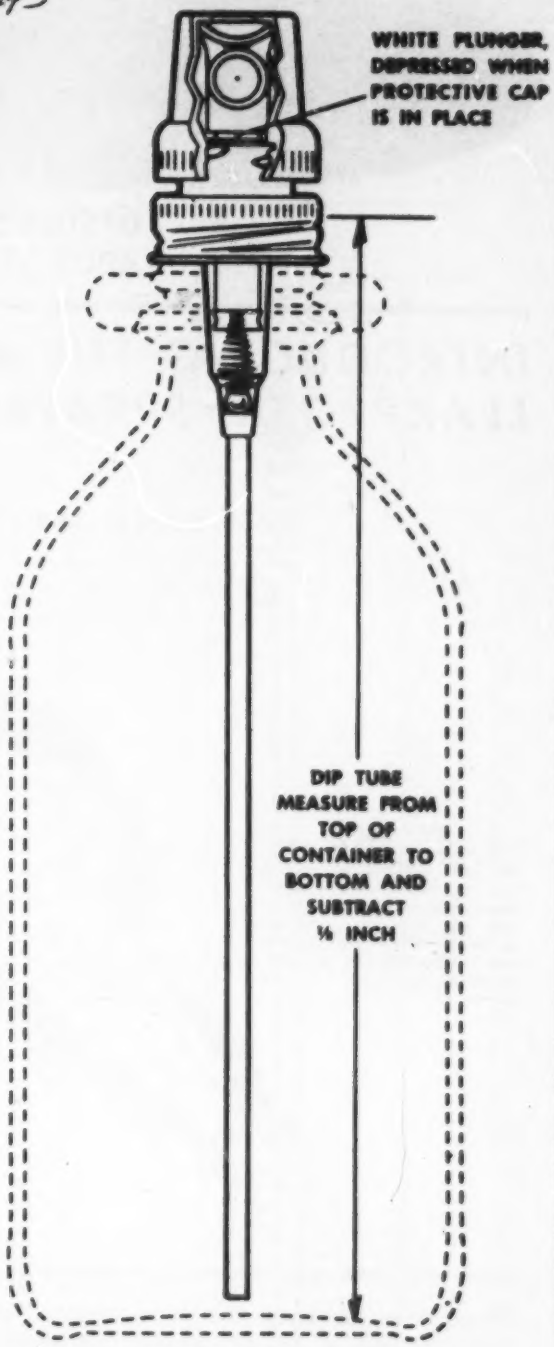
JG:lg

P.S.—Enclosed you will find catalog pages which illustrate both model 1 and model 2 sprayers—long and short stroke—which will give you prices on either unit. We are also enclosing samples of our model 1.

BAKAN
MODEL 2 LEAKPROOF
SPRAYER

343

MC . 2 PLASTIC SPRAYER



PRICES

QUANTITY	PRICE PER THOUSAND
1,000	$84.00 per thousand
5,000	81.00 per thousand
10,000	79.00 per thousand
25,000	77.00 per thousand
50,000	76.00 per thousand
100,000 and up	Annual Contract quoted on request

TERMS

TERMS: 1% 10 Days — Net 30
F.O.B. Kansas City, Missouri
MINIMUM ORDER: 1,000 Sprayers to case
CASE WEIGHT: 34 lbs.

COLORS:

ALL WHITE or WHITE plunger with RED, BLUE, GREEN or YELLOW head and collar. Be sure to specify color when ordering.

Special color combinations available in quantities of 100,000 or more prices quoted on request.

CAPS:

Available in stock in following sizes and colors:

WHITE METAL—20, 22, 24, 26, 28, 33mm, 400 finish
BLUE METAL—26 & 28mm
YELLOW METAL—28mm
BLACK BAKELITE—24 & 28mm—$3.00/M extra
WHITE UREA—24 & 28mm—$6.00/M extra

Bakan can furnish metal or molded caps in any size or color in quantities of 100,000 or more. Prices quoted on request.

If customer furnishes molded caps, there will be a boring charge of $1.50/M.

DIP TUBES:

Dip tubes will be cut to any desired length at no additional cost. When ordering specify over-all length from top of container to desired length. Please submit sample bottle or container to insure accuracy.

NOTE: When ordering be sure to specify: Model Number, Cap size and color, Sprayer color, Dip Tube length, Plunger (standard or short).



NEW SHORT STROKE PLUNGER NOW AVAILABLE

Bakan sprayers may now be equipped with the new short stroke plunger which delivers less volume and is specifically designed for products such as window cleaners, spot removers, hair sprays, etc.

The standard, long stroke plunger is ideally suited for insecticides and other products where delivery of greater volume per stroke is desired.

When ordering specify short plunger if desired. Unless otherwise specified, sprayers will be equipped with standard, long stroke, plunger.

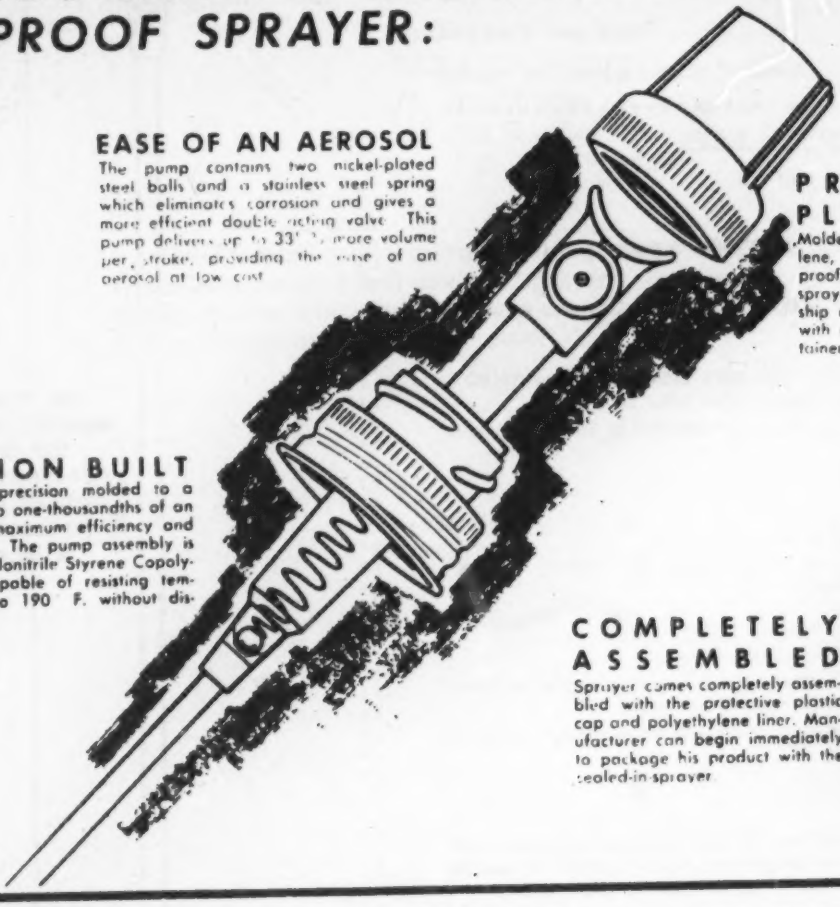
344

PRECISION MADE

Sprayers and Dispensers

DESIGNED FOR HIGH QUALITY, AT LOW COST ADDS STYLE AND PERFORMANCE TO ANY PRODUCT

INTRODUCING THE BAKAN MODEL 2 LEAKPROOF SPRAYER:



EASE OF AN AEROSOL

The pump contains two nickel-plated steel balls and a stainless steel spring which eliminates corrosion and gives a more efficient double acting valve. This pump delivers up to 33⅓% more volume per stroke, providing the ease of an aerosol at low cost.

PROTECTIVE PLASTIC CAP

Molded of high quality polyethylene, it provides a sealed, leakproof, protective cover for the sprayer. Enables manufacturer to ship and merchandise his product with a sprayer sealed in the container—ready to use.

PRECISION BUILT

All parts are precision molded to a tolerance of two one-thousandths of an inch, insuring maximum efficiency and operating ease. The pump assembly is molded of Acrylonitrile Styrene Copolymer (TYRIL) capable of resisting temperatures up to 190° F. without distortion.



COMPLETELY ASSEMBLED

Sprayer comes completely assembled with the protective plastic cap and polyethylene liner. Manufacturer can begin immediately to package his product with the sealed-in sprayer.

NOTE: Model 2 Leakproof Sprayers, identified as "Sprayers with Protective Caps" are patented under U.S. Letters Patent No. 2,870,943

The plastic components of the BAKAN Model 2 Leakproof Sprayer is compatible with most chemicals where sprayers are commonly used. It is suggested, however, that each product be thoroughly tested with the sprayer to make sure they are compatible.

distributed by:

BAKAN 2500 SUMMIT KANSAS CITY 41

BAKAN

345

MODEL 1 SPRAYER

PRICES

QUANTITY	PRICE PER THOUSAND
1,000	$74.00 per thousand
5,000	71.00 per thousand
10,000	69.00 per thousand
25,000	67.00 per thousand
50,000	66.00 per thousand
100,000 and up	Annual Contract quoted on request

TERMS

TERMS: 1% 10 Days — Net 30
F.O.B. Kansas City, Missouri
MINIMUM ORDER: 1,000 Sprayers
PACKED: 1,000 Sprayers to case
CASE WEIGHT: 28 lbs.

COLORS:

ALL WHITE or WHITE plunger with RED, BLUE, GREEN or YELLOW head and collar. Be sure to specify color when ordering.

Special color combinations available in quantities of 100,000 or more Prices quoted on request.

CAPS:

Available in stock in following sizes and colors:

WHITE METAL—20, 22, 24, 26, 28, 33mm, 400 finish
BLUE METAL—26 & 28mm
YELLOW METAL—28mm
BLACK BAKELITE—24 & 28mm—$3.00/M extra
WHITE UREA—24 & 28mm—$6.00/M extra

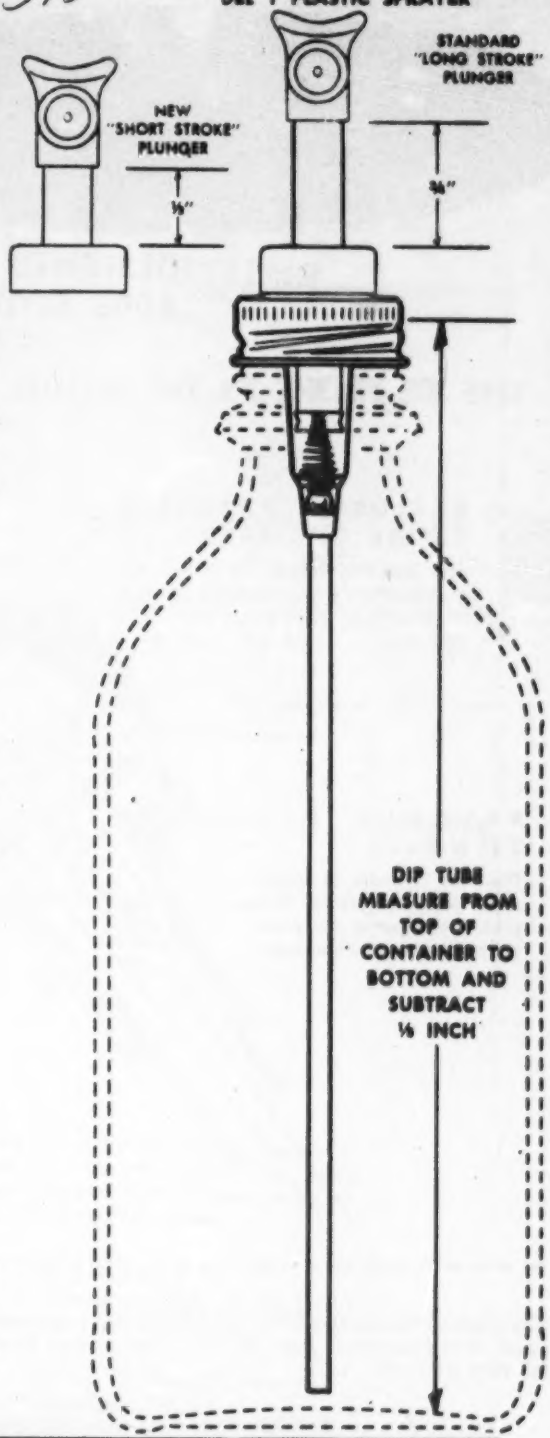
Bakan can furnish metal or molded caps in any size or color in quantities of 100,000 or more. Prices quoted on request.

If customer furnishes molded caps, there will be a boring charge of $2.50/M.

DIP TUBES:

Dip tubes will be cut to any desired length at no additional cost. When ordering specify over-all length from top of container to desired depth. Please submit sample bottle or container to insure accuracy.

NOTE: When ordering be sure to specify: Model Number, Cap size and color, Sprayer color, Dip Tube length, Plunger (standard or short).

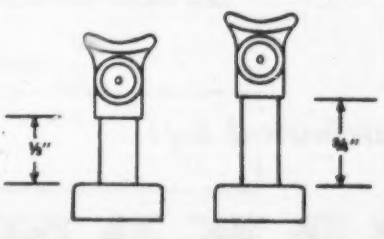


NEW SHORT STROKE PLUNGER NOW AVAILABLE

Bakan sprayers may now be equipped with the new short stroke plunger which delivers less volume and is specifically designed for products such as window cleaners, spot removers, hair sprays, etc.

The standard, long stroke plunger is ideally suited for insecticides and other products where delivery of greater volume per stroke is desired.

When ordering specify short plunger if desired. Unless otherwise specified, sprayers will be equipped with standard, long stroke, plunger.



346

PRECISION MADE

Sprayers and Dispensers

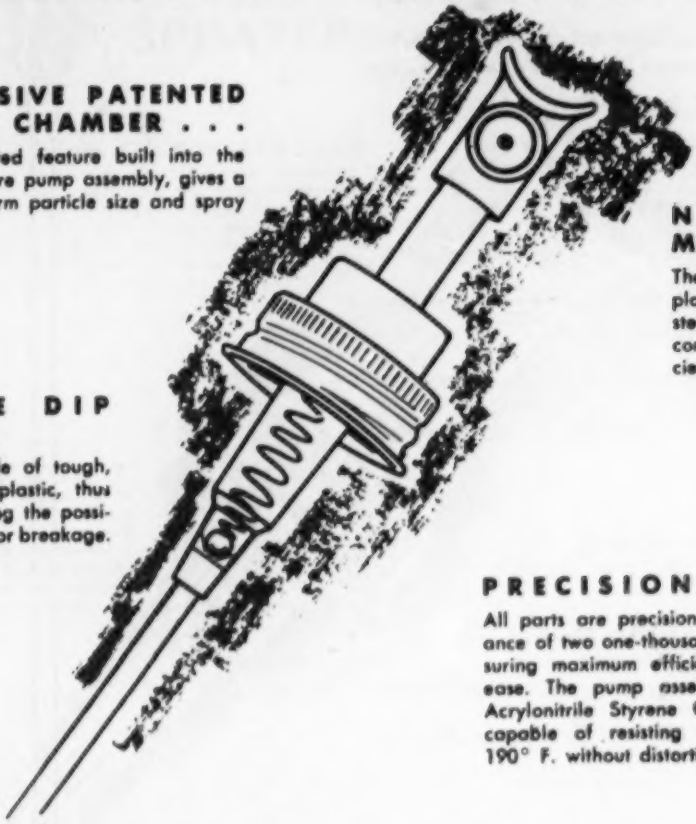
DESIGNED FOR HIGH QUALITY, AT LOW COST
ADDS STYLE AND PERFORMANCE TO ANY PRODUCT

THE BAKAN MODEL 1 PLASTIC SPRAYER . . .



EXCLUSIVE PATENTED SWIRL CHAMBER . . .

This patented feature built into the high-pressure pump assembly, gives a more uniform particle size and spray pattern.



NON CORROSIVE METAL PARTS...

The sprayer contains two nickel-plated steel balls and a stainless steel spring, which eliminates corrosion and gives a more efficient, double-acting valve.

PLIABLE DIP TUBE...

The tube is made of tough, semi-rigid vinyl plastic, thus greatly eliminating the possibility of damage or breakage.

PRECISION BUILT...

All parts are precision molded to a tolerance of two one-thousandths of an inch, insuring maximum efficiency and operating ease. The pump assembly is molded of Acrylonitrile Styrene Copolymer (TYRIL) capable of resisting temperatures up to 190° F. without distortion.

The plastic components of the BAKAN Model 1 sprayer is compatible with most chemicals where sprayers are commonly used. It is suggested, however, that your product be thoroughly tested with the sprayers to make sure they are suitable for your product.

BAKAN offers your company specialized laboratory analysis and will develop and design special sprayers or dispensers to fit your product and package.

distributed by:

BAKAN Plastics 2500 SUMMIT

PLAINTIFF'S EXHIBIT E

347

643711	P. R. Div.		PATENT NUMBER 2870943
	Class	Subclass	DATED JAN 27 1959
	Filed complete (Date) MAR 4, 1957	Serial No 643 711	CLAIMS FOREIGN PRIORITY Country / Date
			Number claims allowed 4 / Print claim(s) 1 / Class 222 / Subclass 182

HIGGIN, BAXTER H., JR., SE. KANSAS CITY, MO.

Assignor, by mesne assignments, to Baxter Laboratories, Inc., Morton Grove, Illinois, a corporation of Missouri.

Assignee: Cook Chemical Company, Kansas City, Mo., a corp. of Missouri.

HP-TYPE LIQUID SPRAYER HAVING HOLD-DOWN

☐ Division of ☐ Continuation of ☐ Continuation-in-part of
☐ Substitute for abandoned

APPLICATION Serial No.	Filed	APPLICATION Serial No.

Extra claims	Filing fee $30	Transaction 22300	Attys docket 7542	New Patent No.	Granted	Filed

This is to certify that annexed hereto is a true copy from the records of the United States Patent Office of File Wrapper and Contents of the file identified above.

By authority of the
COMMISSIONER OF PATENTS

H. W. Lambert
Certifying Officer

Date September 22, 1959

348

643711
SERIAL NO. (Series of 1948)

P. R. Div.

Assistant examiner

Class | Subclass

Division No.: 35

Filed complete (Date): MAR 4, 1957

Serial No.: 643 711

PATENT NUMBER 2870943

DATED JAN 27 1959

CLAIMS FOREIGN PRIORITY

Country	Date

Applicant(s)

SCOGGIN, BAXTER L. JR., KANSAS CITY, MO.

Number claims allowed	Print claim(s)	Class	Subclass
4	1	222	182

Assignee(s) Baxter Laboratories, Inc., Morton Grove, Ill., a corporation of Delaware; Cook Chemical Company, Kansas City, Mo., a corporation of Missouri.

Title of invention

PUMP-TYPE LIQUID SPRAYER HAVING HOLD-DOWN CAP

☐ Division of ☐ Continuation of ☐ Substitute for abandoned

APPLICATION: Serial No. | Filed

☐ Continuation-in-part of

APPLICATION: Serial No. | Filed

Now Patent No. | Granted

No. dwg.	Extra claims	Filing fee	Transaction	Atty's docket
1		$30	22300	7542

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C. EARL HOVEY

FEDERAL RESERVE BANK BLDG

KANSAS CITY 6, MO.

123

Principal attorney(s)

C. EARL HOVEY

Associate attorney(s)

PARTS OF APPLICATION FILED SEPARATELY

PREPARED FOR ISSUE

(Assistant Examiner) (Docket Clerk)

EXAMINED AND PASSED FOR ISSUE

(Primary Examiner) (Division)

NOTICE OF ALLOWANCE MAILED

FINAL FEE

Date	Amount
NOV 28 1958	$30

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Form PO-606 (7-1-55)

10—1137a-1

PLAINTIFF'S EXHIBIT E

[1023]

C. EARL HOVEY
Attorney at Law

United States & Foreign
Patent, Trademark & Copyright
Causes Exclusively

Gordon D. Schmidt
Donald E. Johnson
Robert D. Hovey

Telephones VIctor 2-2177
VIctor 2-2459
1001-3 Federal Reserve Bank Bldg.
Kansas City 6, Missouri

March 1, 1957

Hon. Commissioner of Patents
Washington 25, D. C.

Sir:

Enclosed herewith please find the complete application for Letters Patent of BAXTER I. SCOGGIN, JR., covering improvements in PUMP-TYPE LIQUID SPRAYER HAVING HOLD-DOWN CAP.

The filing fee in the form of a check from the Attorney in the case and drawn to the amount of $30.00 is attached hereto.

Please forward the filing receipt to this office at your early convenience.

Respectfully submitted,

/s/ C. Earl Hovey
Attorney for Applicant

CEH:lb-
Encl.

[1024] PUMP-TYPE LIQUID SPRAYER HAVING HOLD-DOWN CAP

This invention relates to improvements in structures for dispensing liquids wherein is provided a spray-type hand pump mounted within a container for the liquid through use of the closure cap of such container.

It is common practice, as exemplified for example by Patent No. 2,362,080, issued November 7, 1944, to dispense various types of liquids such as insecticides, through use of a finger-manipulated spray pump normally sold as a component part of the container itself. The pump includes a vertically reciprocable plunger extending upwardly beyond the top of the cap within which the pump is mounted and provided with a spray head or nozzle structure capable of emitting a fine mist-like spray when the plunger is depressed by engagement with a finger-receiving saddle forming a part of the spray head.

Difficulties have been experienced in the field by virtue of the inherent nature of such structure since accidental actuation of the plunger causes dispensing of the fluid and oftentimes the material is used in part by store employees prior to sale because of the ready accessibility to the pump itself.

It is the most important object of the present invention, therefore, to provide structure for rendering the pump inoperable during shipment and while in storage, as well as on the shelves of the retail dealer.

[1025] Another important object of the present invention is to provide structure capable of carrying out the functions above set forth which is also adapted to enclose the head of the plunger and thereby protect the same, as well as handlers of the merchandise by virtue of the fact that the said plunger is completely enclosed and held at the innermost end of its reciprocable path of travel.

A further object of the instant invention is to provide a hold-down cap that may be quickly and easily applied and removed by virtue of a releasable attachment to a part of the entire unit such as by use of screw-threaded interengagement therewith.

A further object of this invention is to provide improvements of the aforementioned character that advantageously employs a part of the unit which has a secondary function of attaching the barrel of the spray pump to the closure cap of the container.

Other objects include important details of construction to be made clear or become apparent as the following specification progresses, reference being had to the accompanying drawing, wherein:

Figure 1 is a fragmentary, elevational view of a liquid container showing a pump-type sprayer as a part thereof and including the novel hold-down cap of the instant invention, parts being in section for clearness.

Fig. 2 is a fragmentary, vertical, cross-sectional view through the container and its cap showing the pump assembly in its operable position with the hold-down cap removed; and

[1026] Fig. 3 is an exploded perspective view showing the hold-down cap and certain parts of the sprayer with which the same is operably associated.

Pump-type sprayer 10 for liquid container 12 is attached to cap 14 for retention thereby when cap 14 is removed from threaded neck 16 of container 12, and if desired, there may be provided sufficient clearance between cup-shaped retainer 18 and annular outturned flange 20 to permit rotation of cap 14 relative to sprayer 10.

Both cap or closure 14 and retainer 18 are received by a cylindrical extension 22 of frusto-conical barrel 24, forming a part of the sprayer 10, extension 22 being integral with flange 20 at the innermost edge of the latter. Flange 20 is integral with barrel 24 near the larger, uppermost edge of the latter and is held against the under side of gasket 38 in the cap 14 when the sprayer 10 is operably associated with container 12.

Retainer 18 is provided with a central opening 25 which receives tubular plunger 26 and has a cavity 27 that accommodates the enlarged extension 22 as is clear in Fig. 2. Retainer 18 is fitted tightly over the extension 22 and maintains the retainer in place with flange 20 against gasket 38 as above set forth.

Reduced end 28 of barrel 24 receives a tube 30 that extends to the bottom of container 12, it being understood

that the sprayer 10 is internally constructed in a suitable manner as, for example, in accordance with teachings of the aforementioned patent to pump liquid [1027] from the container 12 into the tube 30 and thence through nozzle 32 forming a part of a spray head 34 secured to the upermost end of plunger 26. The enlarged head 34 is normally depressed by one finger as the operator grasps the container 12 as is well understood in this art.

Cap 14 has a clearance opening 36 therein, as best shown in Fig. 2, for the extension 22 of barrel 24 and when the cap 14 is in screw-threaded engagement with neck 16, the gasket 38 which surrounds barrel 24, is clamped tightly between flange 20 and the under side of the top of cap 14.

A hold-down member broadly designated by the numeral 40, is provided to hold the plunger 26 at the lowermost end of its path of travel within the barrel 24 in the manner illustrated by Fig. 1, it being understood as by reference to said patent, that a spring (not shown) within the barrel 24, yieldably biases the plunger 26 upwardly to the position shown in Fig. 2. The hold-down member 40 is preferably in the nature of a hollow cap so that the same not only encloses or houses the upper end of plunger 26, i. e. spray head 34, but releasably attaches to the retainer 18 and also houses the latter.

A cylindrical bore 42 within the hold-down cap 40 receives the head 34 as seen in Fig. 1, and enlargement of the bore 42 adjacent the lowermost open end of the cap 40 is provided with internal screw threads 44 that mesh with external screw threads 46 on the retainer 18, thereby releasably attaching the cap 40 to the retainer 18.

[1028] An enlarged, annular boss 48 on the cap 40 is provided with a ribbed, outermost surface to facilitate mounting and removal of the cap 40 relative to retainer 18. A downwardly-facing shoulder 50 within the cap 40 engages the upper surface of retainer 18, thereby preventing engagement between cap 40 and closure 14 to prevent forcing of the retainer 18 from its tight pressfit engagement with extension 22. As illustrated, the screw threads 46 on the retainer 18 are in the nature of a pair of substantially semi-circular, spirally arranged sections

52 and 54, permitting molding of the retainer 18 with its screw threads 46 as a single unitary part.

In addition to the seal provided between shoulder 50 and the top surface of retainer 18, there is established an additional annular seal between annular rib 56 and the annular surface of cap 40 immediately adjacent to shoulder 50. This seal is clearly illustrated in Figure 1. The cross-sectional contour of rib 56 is as shown in Fig. 2 to present an upwardly and inwardly inclined annular face which snugly fits against the "corner" or line of juncture between shoulder 50 and the adjacent annular inner face of cap 40.

The interfitting surfaces between extension 22 and retainer 18 are as illustrated in Fig. 2. There is an annular notch formed in extension 22 at the outer extremity thereof and this notch 58 receives a similarly formed, continuous annular projection 60 formed integrally with retainer 18 and at a point where elements 58 and 60 will interlock when the parts are in assembled condition.

[1029] Thus, any accidental leakage or seepage from container 12 through the parts after they are assembled is obviated.

The material from which retainer 18 is produced is soft enough to be slightly compressed when shoulder 50 and the corner adjacent thereto, rides along the upwardly and inwardly inclined outer face of rib 56 when cap 40 is moved to position.

[1030] Having thus described the invention what is claimed as new and desired to be secured by Letters Patent is:

1. In combination with a sprayer unit for a liquid container, said unit including a closure for the container, and a spray pump, secured to the closure, and provided with a reciprocable plunger; and a member holding the plunger at one end of its path of travel and releasably attached to said unit.

2. The invention as set forth in claim 1 wherein said member is hollow and houses a portion of the plunger.

3. The invention as set forth in claim 1, there being a screw-threaded attachment of the member to said unit.

4. In combination with a pump sprayer provided with a barrel and a plunger reciprocable within the barrel and

normally extending therebeyond; a hold-down member for holding the plunger depressed at the innermost end of its path of travel within the barrel; and releasable means attaching the member to the barrel.

5. The invention as set forth in claim 4, there being a screw-thread attachment of the member to the barrel.

6. The invention as set forth in claim 4 wherein is provided a collar on the barrel having a clearance opening for the plunger, the member being releasably attached to the collar.

[1031] 7. The invention as set forth in claim 4 wherein said member is hollow and houses the outermost end of the plunger when the member is attached to the barrel.

8. The invention as set forth in claim 7, the member being provided with internal screw threads and the barrel being provided with means presenting external screw threads receiving said screw threads of the member.

9. In combination with a pump sprayer provided with a barrel having a cap for a container mounted thereon and a reciprocable plunger extending above the cap; a retainer on the barrel for holding the cap thereon; and a hold-down member releasably attached to said retainer for holding the plunger depressed at the innermost end of its path of travel within the barrel.

10. The invention as set forth in claim 9 wherein said member is hollow and houses the retainer and the uppermost end of the plunger when attached to the retainer.

11. The invention as set forth in claim 10 wherein is provided intermeshing screw threads between the member and the retainer.

[1032] 12. In combination with a liquid container having a neck provided with a perforated closure; a pump spray having a barrel within the perforation of said closure and a pumping plunger reciprocable within the barrel and spring-biased toward the outermost end of its path of travel extending upwardly beyond the closure; means including a retainer on the barrel above the closure for holding the barrel attached to the closure; and a hollow cap releasably attached to said retainer and housing the uppermost end of the plunger for holding the latter at the lowermost end of its path of travel within the barrel.

13. The invention as set forth in claim 12 wherein said retainer comprises a collar surrounding the barrel and having a clearance opening for the plunger.

14. The invention as set forth in claim 13, said barrel having an outturned flange, the closure being clamped between the retainer and the flange.

15. The invention as set forth in claim 13, the cap housing the retainer and having screw-threaded connection therewith.

[1033] Sole

APPLICATION FOR UNITED STATES PATENT
Oath, Power of Attorney, and Petition

Being duly sworn, I BAXTER I. SCOGGIN, JR., depose and say that I am a citizen of The United States of America residing at 1223 West 66th Terrace, Kansas City, Missouri; that I have read the foregoing specification and claims and I verily believe I am the original, first, and sole inventor of the invention or discovery in PUMP-TYPE LIQUID SPRAYER HAVING HOLD-DOWN CAP described and claimed therein; that I do not know and do not believe that this invention was ever known or used before my invention or discovery thereof, or patented or described in any printed publication in any country before my invention or discovery thereof, or more than one year prior to this application, or in public use or on sale in the United States for more than one year prior to this application; that this invention or discovery has not been patented in any country foreign to the United States on an application filed by me or my legal representatives or assigns more than twelve months before this application; and that no application for patent on this invention or discovery has been filed by me or my representatives or assigns in any country foreign to the United States, except as follows:

No Exceptions

And I hereby appoint C. EARL HOVEY of Federal Reserve Bank Building, 925 Grand Avenue, Kansas City 6, Missouri. Registration No. 11,861, my attorney with full

power of substitution and revocation, to prosecute this application and to transact all business in the Patent Office connected therewith.

Wherefore I pray that Letters Patent be granted to me for the invention or discovery described and claimed in the foregoing specification and claims, and I hereby subscribe my name to the foregoing specification and claims, oath, power of attorney, and this petition, this 15th day of February, 1957.

Inventor	Baxter	I.	Scoggin, Jr.
	First name	Middle initial	Last name
	Baxter	I.	Scoggin, Jr.
Post Office Address	1223 West 66th Terrace Kansas City, Missouri		

State of MISSOURI)
) SS
County of JACKSON)

Before me personally appeared BAXTER I. SCOGGIN, JR., to me known to be the person described in the above application for patent, who signed the foregoing instrument in my presence, and made oath before me to the allegations set forth therein as being under oath, on the day and year aforesaid.

/s/ Helen A. Moore
Seal Notary Public

My Commission Expires July 27, 1959

This form may be executed only when attached to a complete application as the last page thereof.

Approved Single Signature Form
Sole Inventor

357

#2
SN. 35

643711

NOV 18 1958

2,870,943

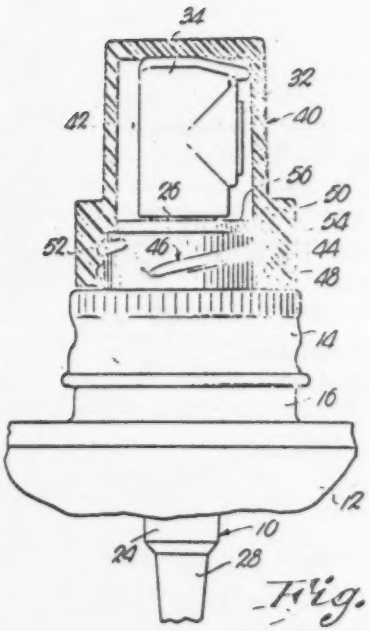


Fig. 1.

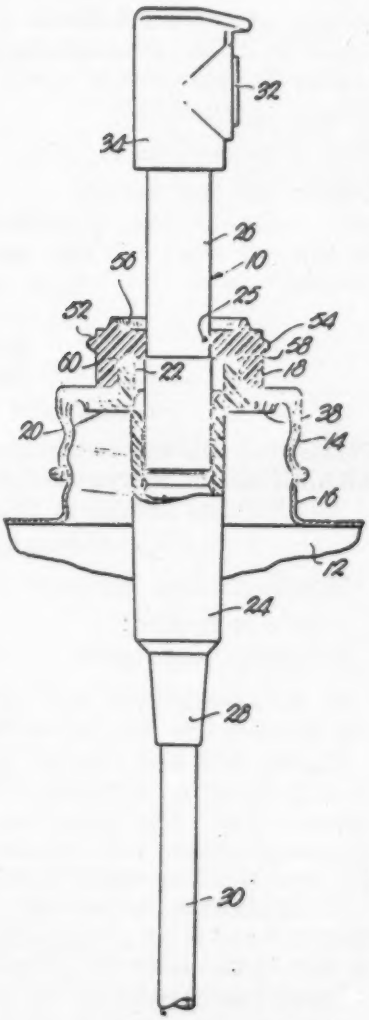


Fig. 2.

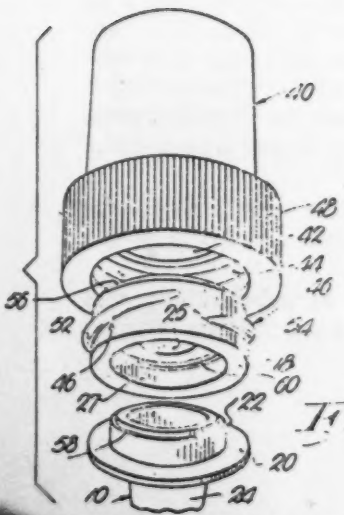


Fig. 3.

INVENTOR.
Baxter I. Scoggin
BY
ATTORNEY

[1035]

All communications respecting this application should give the serial number, date of filing, and name of the applicant.

U. S. DEPARTMENT OF COMMERCE
United States Patent Office
Washington

Paper No. 3

C. Earl Hovey
Federal Reserve Bank Bldg.
Kansas City 6, Mo.

Applicant: Baxter I. Scoggin, Jr.
Ser. No. 643,711
Filed March 4, 1957
For PUMP-TYPE LIQUID SPRAYER HAVING HOLD-DOWN CAP
Mailed Nov. 5, 1957 Pat. Div. 35

Please find below a communication from the EXAMINER in charge of this application.

/s/ Robert C. Watson
Commissioner of Patents.

This application has been examined.

Reference applied:

3 Lohse	2,119,884	June 7, 1938	222-182

In the specification, page 4, line 6, the clearance opening 36 cannot be located on the drawings.

Claims 1-11 are rejected as vague and indefinite, in that it cannot be determined what applicant considers as his invention. The claims purport to be drawn to a certain combination, but because of the particular punctuation employed in the independent claims, it is not clear what applicant considers old and what he considers new. Claims 4 and 9 are particularly vague in that a semi-colon is used in two different places.

Claim 6 is further rejected as vague and indefinite, there being no antecedent in the specification for the collar. It is believed this is the retainer 18.

Claims 1-11 are further rejected as substantially met by Lohse cited. There is shown the hold down member

12 releasably secured by screw threads to a retainer 4 which slidably houses a reciprocable plunger 6. It is not patentably significant [1036] in the absence of some new or unexpected result that the Lohse does not show the barrel 24 of applicant's device as continuing up to the top of the container since this barrel is part of the pump structure and is not seen to be essential to the essence of the present invention. Note therefore the barrel forming the piston chamber 16 of Lohse as being the full equivalent of applicant's barrel 24. It does not therefore appear to make any patentable difference whether the barrel is attached to the retainer and the plunger reciprocates therein, or is separate from the retainer and the plunger reciprocates through the retainer as seen in Lohse. The clamping nut 5 of Lohse performs the same function of holding the barrel in place as does the barrel extension of applicant's device.

All claims rejected.

/s/ L. J. Dumbo
Examiner

M.D.W.
MDWittstein:hej

[1037] IN THE UNITED STATES PATENT OFFICE
(Paper No. 4. May 5, 1958. Div. 35.)

Application of	)	April 30, 1958
BAXTER I. SCOGGIN, JR.	)	
Serial No. 643,711	)	
Filed March 4, 1957	)	PAT. DIV. 35
PUMP-TYPE LIQUID SPRAYER	)	
HAVING HOLD-DOWN CAP	)	

Hon. Commissioner of Patents
Washington 25, D. C.
Sir:

Responsive to Office Letter of November 5, 1957, please amend the above-identified application as follows:

SPECIFICATION

Page 4, line 6, erase "36". Same line, after "therein" insert ....., as best shown in Fig. 2, ...

CLAIMS

Cancel Claims 1-15 inclusive.

Add the following claims:

16. In a cap for containers having a spray unit supported by the cap including a reciprocable plunger extending through the cap and provided with a spray head, the improvement of which comprises a retainer attaching the unit to the cap and provided with external screw threads; and a hollow member for housing the head and maintaining the plunger depressed, said member being screw-threaded on the retainer and provided with a continuous internal shoulder, said retainer [1038] having a continuous rib in complemental, circumscribing engagement with the shoulder and disposed to hold the member out of engagement with the cap, whereby to prevent displacement of the retainer from said unit when the member is attached to the retainer.

17. The invention as set forth in Claim 16, the inner-engaging surfaces of the shoulder and rib being wedge-shaped and the rib being yieldable whereby to present a liquid seal when the member is attached to the retainer.

REMARKS

Claims 1-11 acted upon by the Honorable Examiner in the above mentioned Office Action have been cancelled as well as have Claims 12-15 which were not acted upon by the Honorable Examiner in said Office Action. Thus, new Claims 16 and 17 remain in this case for consideration.

Said claims clearly point out the novel features of Applicant's hold-down unit whereby the entire assembly is maintained in a predetermined position as shown in Fig. 1 and where the cap and hold-down assembly are rendered leak-proof by the particular manner in which retainer 18 and hold-down member 40 are inter-engaged.

The provision of a continuous internal shoulder within hold-down cap 40 which inter-engages in complemental, circumscribing relation with the rib provided along the upper edge of retainer 18 is clearly set forth in Claim 16. Such inner-engagement of the above mentioned parts prevents the hold-down member from being forced downwardly [1039] against cap 14 whereby the retainer would be pulled upwardly into the hold-down member and the retainer dislodged from its position on the cap which in turn would result in the barrel being dropped from its position of retention by retainer 18.

As further pointed out in Claim 17, the inner-engaging surfaces of the shoulder and the rib are so shaped as to present a liquid seal and thus insure that none of the contents of the bottle passes out of the hold-down member. This is particularly important inasmuch as when the barrel is initially depressed in packing the goods of a liquid nature there is a certain amount of the liquid which is retained upon nozzle 32 even after hold-down member 40 is inserted. Inasmuch as it is undesirable to have this liquid or for that matter, any liquid contained within the bottle upon which the assembly is placed, leak during transportation, display or warehousing of the merchandise, it is essential that a satisfactory seal be provided to prevent such leakage. This seal is particularly provided by the inner-engagement of the shoulder and the rib as pointed out in the claims now remaining in this case and it is believed that such construction is novel to Applicant's device.

Clearly, such a provision for the prevention of leakage is not shown by Lohse who attempts to accomplish such results by screwing his hold-down cap 12 tightly against gasket 3 which is held between the [1040] cap of the bottle and the hold-down cap for the nozzle. Inasmuch as it is not desired in Applicant's device to have the hold-down member come in contact with the cap of the bottle, for the reasons previously mentioned herein, Applicant has devised the new and novel sealing features as are now set forth in Claims 16 and 17. It is to be further noted that a tight seal is further insured by making retainer 18 of a material soft enough to be slightly compressed when shoulder 50 is brought to bear tightly against rib 56.

Inasmuch as none of the features now called for by Applicant are shown, or for that matter suggested by the references of record, it is respectfully submitted that this application is entitled to allowance when it is next reached for attention by the Honorable Examiner.

Respectfully submitted,

/s/ C. Earl Hovey

Attorney for Applicant

CEH:1b-5

362

[1041]

All communications respecting this application should give the serial number, date of filing, and name of the applicant.

U. S. DEPARTMENT OF COMMERCE
Patent Office
Washington

Paper No. 5

Applicant: Baxter I. Scoggin, Jr.
Ser. No. 643,711
Filed March 4, 1957
For PUMP-TYPED LIQUID SPRAYER HAVING HOLD-DOWN CAP
Mailed Oct. 1, 1958 Pat. Div. 35

C. Earl Hovey
Federal Reserve Bank Bldg.
Kansas City 6, Mo.

Please find below a communication from the EXAMINER in charge of this application.

/s/ Robert C. Watson
Commissioner of Patents.

Responsive to amendment filed May 1, 1958.

Additional references cited:

2 Nilson	2,118,222	May 24, 1938	222-538
5 Slade	2,844,290	July 22, 1958 (Filed July 27, 1955)	222-542 x

Cancellation of claims 1-15 is of record. The Examiner regrets the inadvertence of overlooking claims 12-15 in the prior Office action.

New claims 16 and 17 are rejected as unpatentable over Lohse of record, in view of either Slade or Nilson, both cited above. To provide the Lohse device with a rib or stop surface on the retainer 4 to cooperate with an inter-engaging shoulder or surface on the inside of the cap to prevent the cap from seating on the container cap is a feature old in the art, as shown by Slade or Nilson, the latter clearly in Fig. 5. Therefore, this modification of

Lohse does not require the exercise of invention. Also, the particular configuration of the inter-engaging surfaces is not of patentable significance, since the flat abutting surfaces of the Nilson and Slade devices will provide an effective seal, and are therefore the full equivalent of applicant's wedge-shaped surfaces.

Claims 1-15 canceled.

Claims 16-17 rejected.

[1042] IN THE UNITED STATES PATENT OFFICE

Application of	)	November 1, 1958
BAXTER I. SCOGGIN, JR.	)	
Serial No. 643,711	)	PAT. DIV. 35
Filed March 4, 1957	)	
PUMP-TYPE LIQUID SPRAYER	)	
HAVING HOLD-DOWN CAP	)	

Hon. Commissioner of Patents
Washington 25, D. C.

Sir:

Responsive to Office Letter of October 1, 1958, please enter the following amendment in the above identified application.

CLAIMS

Cancel Claims 16 and 17.

Add the following claims:

18. In a closure assembly for an open-top container having a perforated cap over said open top thereof mounting a spray unit including a barrel, an extension passing coaxially through the perforation in said cap, a plunger reciprocably carried by the barrel and normally extending therebeyond and a spray head on the upper end of the plunger above said extension, the combination with said spray unit of an annular retainer secured to and surrounding the extension above said cap and provided with external, circumferentially disposed screw threads and an annular, continuous segment at the upper peripheral edge of the retainer above said screw threads, and a cup-shaped cap member housing the head and holding the plunger depressed at substantially the [1043] innermost

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path of travel thereof within the barrel, said member being provided with internal screw threads complementally engaging said screw threads on the retainer and having an internal, circumferentially extending, continuous shoulder disposed to engage said segment around the entire periphery thereof and thereby present a liquid tight seal located between the spray head and said threads on the retainer and said member respectively, said segment and the shoulder being disposed to maintain the lower peripheral margin of the member out of engagement with the cap when the segment and shoulder are in sealing interengagement.

19. A closure assembly as set forth in Claim 18 wherein one of the normally interengaged surfaces of the shoulder and segment respectively is substantially conical to present an inclined annular face coaxial with the member and said retainer and of sufficient diameter at the largest end thereof to cause the seal effected between the shoulder and said segment to become tighter as the shoulder slides on said segment during shifting of the member toward the cap.

20. A closure assembly as set forth in Claim 19 wherein said retainer is provided with a continuous, annular rib integral with the normally upper edge thereof and defining said segment, said rib having an outwardly facing, inclined surface presenting said conical face and of greatest external diameter at the zone of juncture of the rib with the retainer, said member having a pair [1044] of inner, coaxial, longitudinally spaced, cylindrical surfaces, the innermost cylindrical surface having a smaller diameter than the outermost cylindrical surface and presenting said shoulder therebetween lying in a plane perpendicular to the axes of said cylindrical surfaces, the diameter of said innermost cylindrical surface of the member being intermediate the diameters of opposed external end margins of said rib.

21. A closure assembly as set forth in Claim 20 wherein the member and retainer are constructed of materials having different coefficients of hardness whereby one of the interengaged faces of the rib and said shoulder respectively is deformed as the member is shifted toward the cap to thereby produce a more effective seal therebetween.

22. A closure assembly as set forth in Claim 18 wherein said cap member is of sufficient length to hold the spray

head in relatively close proximity to and spaced from the retainer when said shoulder and the segment are in interengagement.

23. In a closure assembly for an open-top container having a perforated cap over said open top thereof mounting a spray unit including a barrel, an extension passing coaxially through the perforation in said cap, a plunger reciprocably carried by the barrel and normally extending therebeyond and a spray head on the upper end of the plunger above said extension, the combination with said spray unit of an annular retainer [1045] secured to and surrounding the extension above said cap and provided with a pair of external, non-overlapping, opposed, substantially semi-circular, spirally arranged screw thread sections on the outer surface of said retainer, and a cup-shaped member housing the head and holding the plunger depressed at the innermost path of travel thereof within the barrel, said member being provided with at least a pair of overlapping courses of screw threads complementally engaging said screw thread sections on the retainers, said courses of screw threads commencing adjacent the outermost peripheral margin of the member at diametrically opposed points whereby both courses of screw threads engage said screw thread sections on the retainer substantially simultaneously during assembly of the member and said retainer and thereby cause the member to be pulled down evenly toward said retainer and into a locked position with only a quarter turn of the member relative to the retainer being required.

24. A closure assembly as set forth in Claim 23 wherein corresponding ends of the screw thread sections lie in respective, parallel, spaced planes perpendicular to the axes of said retainer.

REMARKS

All of the previously submitted claims having been cancelled, Claims 18 to 24 inclusive remain for active consideration in this application.

Applicant has very carefully considered the art made of record thus far in the prosecution of this application as well as the subject matter of the previously [1046] presented claims, and new Claims 18 to 24 inclusive have been carefully drafted to set forth patentable subject matter over the prior patents even when the same are con-

sidered in hypothetical congregation. Analyzing Claim 18, it is to be noted that this claim sets forth in approved Jepson form, the novel combination of retainer 18 and hold-down cap member 40 which cooperate to maintain spray head 34 and its associated plunger 26 substantially at the innermost end of its path of travel and at the same time providing a liquid tight seal *between* spray head 34 and the threaded interengagement of cap 40 with retainer 18. Particular note is directed to the limitations in Claim 18 relative to the provision of means on the retainer and cap member respectively providing a seal below spray head 34 and without the lower peripheral edge of cap member 40 engaging the upper surface of cap 14 on container 12. As indicated in the specification, the above construction is of importance because the required seal between retainer 18 and cap member 40 is effected without the lower peripheral edge of cap member 40 engaging the top of cap 14 which would not only tend to displace retainer 18 from extension 22 of barrel 24 but would also operate to reduce the sealing engagement between rib 56 and shoulder 50, thereby causing the liquid contained within container 12 to leak between interengaged surfaces of cap member 40 and retainer 18.

Comparing the combination set forth in Claim 18 with the patents of record, it is to be noted that [1047] Lohse does not have a pair of normally interengaged surfaces such as rib 56 and shoulder 50 of applicant's unit cooperating to provide a liquid tight seal beneath spray head 30 and above the complementally engaged threads of the assembly, but on the contrary Lohse utilizes a gasket 3 positioned over cap 1 and which is adapted to be engaged by the lower peripheral edge of cap 12 to effect the liquid seal. Not only is applicant's seal much more effective than that possible in the device of Lohse, but because of the way in which the seal is disposed completely interiorly of cap member 40, there is no likelihood of the seal components becoming damaged during assembly and transportation of the unit. It can be recognized that damage of the character referred to above could occur very readily to the closure assembly employed by Lohse, particularly in view of the fact that the sprayers are subjected to relatively rough handling during transportation and merchandising of the same.

Another important fact is that applicant's closure assembly including retainer 18 and cap member 40 is adapted

to be produced of moldable materials to lower the cost of the package as well as providing substances which are resistant to corrosion produced by the liquid in container 12 and thus if the cap 12 of Lohse were produced of polyethylene, for example, as is applicant's cap 40, it would be very difficult to obtain a liquid tight seal between the lower peripheral edge of Lohse's cap 12 and washer 3.

[1048] Applicant has solved the above problems by the construction set forth in Claim 18 and wherein the interengaged seal surfaces are disposed directly above the interengaged threaded sections of cap member 40 and retainer 18 and below spray head 34 whereby screwing of cap member 40 onto retainer 18 produces a tight seal notwithstanding the fact that cap member 40 may be molded of polyethylene or the like and retainer 18 is also of a plastic material.

Modification of Lohse in view of Nilson and Slade still would not produce an assembly as set forth in Claim 18, it being noted that Slade employs sealing liner 25 at the uppermost end of cap member 17 to seal the top of neck portion 16, but this seal is not analogous to or equivalent to applicant's seal provided by rib 56 and shoulder 50 in interengagement when cap member 40 is on retainer 18, nor is Slade's seal member 25 located in the same position as applicant's interengaged sealing parts. It is obvious that placement of a sealing liner 25 in the top of applicant's cap member 40 in overlying relationship to spray head 34 would not be of any effect in preventing leakage of liquid material from cap member 40 through the annular area between retainer 18 and the peripheral edge of cap member 40.

By the same token, Nilson shows no structure capable of providing a seal as is provided in applicant's device. The tabs 22 of Nilson's spout 19 do operate to prevent the lower peripheral margin of spout 19 from contacting the upper surface of the can, but applicant takes [1049] exception to any contention that this is a disclosure of a cap member as illustrated in the drawing of the instant case and clearly claimed in Claim 18. In this respect, it is applicant's contention that the interengaging portions of rib 56 and shoulder 50 serve the important function of providing a liquid tight seal below spray head 34 and are disposed in predetermined positions to prevent the lower peripheral edge of cap member 40 from engaging cap 14 which would thereby decrease the effectiveness of the de-

fined seal. This concept is not inherent in the construction of Nilson and applicant submits that Nilson should be removed as a reference in the further prosecution of this application.

Claim 19 contains an additional limitation directed to the conical configuration of one of the normally interengaged surfaces presenting a seal between cap member 40 and retainer 18 and it is manifest that none of the patents cited show this structure. Improved results are provided by this construction since the seal becomes tighter as cap member 40 is shifted toward cap 14 thereby precluding any liquid from leaking from cap member 40. Claim 19 should also be passed to issue.

Claim 20 is allowable for the reasons advanced with respect to Claim 19 and more specifically sets forth the actual configuration and disposition of rib 56. It is manifest that none of the patents, even when the same are considered together, show these parts and the specific arrangement thereof. Claim 20 is also allowable.

[1050] Claim 21 recites that cap member 40 and retainer 18 are formed of material having different coefficients of hardness whereby a better seal between shoulder 50 and rib 56 is effected because of deformation of one of the latter. As best shown in Fig. 1, cap member 40, for example, may be molded of material somewhat softer than from which retainer 18 is molded whereby shoulder 50 is deformed as cap member 40 is shifted toward cap 14 and thereby assuring an effective fluid tight seal. This concept is new in this art and applicant is entitled to the protection inherent in Claim 21.

Claim 22 states that cap member 40 is of sufficient length to permit shoulder 50 to move into firm interengagement with rib 56 without spray head 34 moving into contacting relationship with retainer 18 and which would thereby operate to decrease the sealing engagement of shoulder 50 with rib 56. This claim is allowable for the reasons set forth above and is entitled to be passed to issue over the previously discussed claims.

Claims 23 and 24 recite the novel screw thread arrangement provided on retainer 18 and cap member 40 and which permits cap member 40 to be screwed onto retainer 18 with only a quarter turn of cap member 40 being required, thus materially reducing the assembly time of the instant closure unit. All of the patents of record show

threaded components wherein it is necessary that the outer part be rotated at least a full turn or more relative to the inner part in order to bring the elements into relatively tight interengagement. The necessity of turning [1051] cap member 40 relative to retainer 18 more than a quarter turn is obviated by the instant construction and applicant submits that the defined structure constitutes a patentable advance in the art and that Claims 23 and 24 are allowable. Note that both of the sections 52 and 54 simultaneously engage the threads on cap member 40, thus causing the latter to be pulled down evenly over retainer 18 toward cap 14 and precluding the possibility of binding of cap member 40 before the same reaches the lowermost end of its path of travel. Claims 23 and 24 clearly are patentable over the art cited.

It is submitted that this case is now in condition for passing to issue and that applicant is entitled to a notice of allowance of Claims 18 to 24 inclusive. Such favorable action is respectfully solicited.

Respectfully submitted,

/s/ C. Earl Hovey

Attorney for Applicant

CEH:jd-4

[1052] IN THE UNITED STATES PATENT OFFICE

(Paper No. 8262 Nov. 13, 1958 Div. 35.)

November 12, 1958

Application of	)	
BAXTER I. SCOGGIN, JR.	)	
Serial No. 643,711	)	DIVISION 35
Filed March 4, 1957	)	
PUMP-TYPE LIQUID	)	
SPRAYER HAVING HOLD-DOWN	)	
CAP	)	

Hon. Commissioner of Patents
Washington 25, D. C.

Sir:

In further response to Office Letter of October 1, 1958, it is respectfully requested that the following amendment be entered in the above identified application:

CLAIMS

Cancel Claims 18 to 24 inclusive.

Add the following claims:

25. In a closure assembly for an open-top container having a perforated cap over said open top thereof mounting a spray unit including a barrel provided with a tubular extension passing coaxially upwardly through the perforation in said cap, a plunger reciprocably carried by the barrel and normally extending therebeyond and a spray head on the upper end of the plunger above said extension, the combination with said spray unit of an annular retainer telescoped over and secured to the extension above said cap and provided with external, circumferentially disposed screw threads and an annular, [1053] continuous segment at the upper part of the retainer above said screw threads, and a cup-shaped hold-down member housing the head and holding the plunger depressed at substantially the innermost path of travel thereof within the barrel, said member being provided with internal screw threads complementally engaging said screw threads on the retainer and having an internal, circumferentially extending, continuous shoulder disposed to engage said segment around the entire periphery thereof and thereby present a liquid-tight seal located between the spray head and said threads on the retainer and said member respectively, said shoulder being spaced from the lower annular peripheral edge of the member a distance at least slightly less than the distance from that portion of said segment normally engaged by said shoulder, to the proximal upper surface of the cap whereby said lower edge of the member is maintained out of contacting relationship with the cap when the member is on the retainer in a position with said shoulder in tight sealing engagement with the segment.

26. A closure assembly as set forth in Claim 25 wherein one of the normally interengaged surfaces of the shoulder and segment respectively is substantially conical to present an inclined annular face coaxial with the member and said retainer and of sufficient diameter at the largest end thereof to cause the seal effected between the shoulder and said segment to become tighter as the shoulder slides on said segment during shifting of the member toward the cap.

27. A closure assembly as set forth in Claim 26 wherein said retainer is provided with a continuous, [1054] annular

rib integral with the normally upper edge thereof and defining said segment, said rib having an outwardly facing, inclined surface presenting said conical face and of greatest external diameter at the zone of juncture of the rib with the retainer, said member having a pair of inner, coaxial, longitudinally spaced, cylindrical surfaces, the innermost cylindrical surface having a smaller diameter than the outermost cylindrical surface and presenting said shoulder therebetween lying in a plane perpendicular to the axes of said cylindrical surfaces, the diameter of said innermost cylindrical surface of the member being intermediate the diameters of opposed external end margins of said rib.

28. A closure assembly as set forth in Claim 27 wherein the member and retainer are constructed of materials having different coefficients of hardness whereby one of the interengaged faces of the rib and said shoulder respectively is deformed as the member is shifted toward the cap to thereby produce a more effective seal therebetween.

REMARKS

Applicant wishes to acknowledge with appreciation the interview courteously granted by the Honorable Examiner and the cooperation received in the drafting of allowable claims which thereby place this application in condition for passing to issue.

During the subject interview, the Honorable Examiner cited two additional patents not previously of record in the prosecution of this application and which were believed to be pertinent as to the allowability of [1055] Claims 18 and 19, presented in applicant's response of November 1, 1958. The new references referred to are U. S. Patent 1,447,712 issued March 6, 1923 to Charles S. Cohen, assignee of John W. Darley, Jr. The other newly applied patent was No. 2,586,687, issued February 19, 1952 to Russell Mellon.

These new patents were carefully studied during the interview and agreement was reached between the Honorable Examiner and applicant's attorney relative to limitations which must be in the claims in order to define novelty over the previously applied disclosure of Lohse when considered in view of the newly cited patents of Mellon and Darley, Jr. It was pointed out that although Mellon does disclose a hold-down cap for liquid spray con-

tainers wherein a seal was effected between spray head 18 and screw threads 30, neither of the patentees disclosed a closure assembly wherein annular segment or rib 56 on retainer 18 and shoulder 50 on cap 40 were disposed in such positions as to cause the lower peripheral edge of cap 40 to be maintained out of contacting relationship with cap 14 when cap 40 was screwed tightly on retainer 18 to cause shoulder 50 to be moved into sealing engagement with rib or segment 56. Lohse's cap 12 clearly moves into contacting relationship with gasket or washer 3, inasmuch as this is the point of sealing engagement between cap 12 and the cap unit 1 on container A, while in Mellon, it also appears, as best shown in Fig. 3, that cap 28 also engages the margin of bottle 10 defined by the ring surrounding the tubular open top thereof. Thus, the obvious modification of Lohse in view of Mellon would be merely to [1056] provide the seal 32 of Mellon within Lohse's cap 12 in a position to engage the upper part of central headed thread 4, while the lower peripheral margin of the cap remained in tight contacting engagement with either the cap on the container or a circumferentially extending projection on the container itself.

As previously indicated, applicant's construction is advantageous wherein the lower peripheral edge of the hold-down member is maintained out of contacting relationship with the cap on the container to not only assure a tight seal between shoulder 50 and rib or segment 56, but also to prevent the cap from tending to dislodge retainer 18 from extension 22 of barrel 24 during assembly of the unit or upon replacement of cap 40.

Applicant's construction is clearly set forth in new Claim 25 wherein it is specifically stated that the distance between shoulder 50 and the lower peripheral margin of cap 40 is at least slightly less than the distance between that portion of rib 56 engaged by shoulder 50 and the upper proximal surface of cap 14, whereby the lower margin of cap 40 is maintained out of contacting relationship with cap 14 when shoulder 50 is in tight sealing engagement with segment or rib 56.

Claim 26, dependent upon Claim 25, is allowable for the same reasons advanced above and further, because of the recitation therein of the provision of a sealing segment on retainer 18 having a conical surface adapted to be engaged by shoulder 50 of cap 40. Although the cylin-

der 11 of Darley, Jr. has a conical surface at the upper peripheral edge thereof, the cap 26 of this patent [1057] is not a hold-down member as defined in the subject claim nor is a sealing engagement provided such as effected between applicant's shoulder 50 and segment or rib 56.

The Honorable Examiner indicated that Claims 20 and 21, now rewritten as Claims 27 and 28, were allowable and therefore, these claims will not be discussed further.

The claims previously submitted relating to the screws on retainer 18 being of particular configuration as well as those on hold-down member 40, having been canceled, the issue of patentability of the subject claims is no longer at issue in this application. However, applicant wishes to make of record the fact that cancellation of these claims is not intended to constitute a dedication of the subject matter to the public, but that such cancellation has been effected to expedite the prosecution of this application only.

This application is now in condition for passing to issue and it is therefore respectfully requested that the Notice of Allowance of Claims 25 to 28 inclusive be forwarded at an early date. Since the application is in condition for immediately passing to issue, it is requested that the same be made special as provided in the Manual of Patent Examining Procedure, for the subject purpose.

Respectfully submitted,
/s/ C. Earl Hovey
Attorney for Applicant

CEH/ef-4

[1058] REFERENCES CITED

Following references are of record in the patented file of this patent:

UNITED STATES PATENTS

Name	Number	Date
Cohen	1,447,712	Mar. 6, 1923
Nilson	2,118,222	May 24, 1938
Lohse	2,119,884	June 7, 1938
Mellon	2,586,687	Feb. 19, 1952
Slade	2,844,290	July 22, 1958

FOREIGN PATENTS

Country	Number	Date

OTHER REFERENCES

374

[1059]

All communications respecting this application should give the serial number, date of filing, and name of the applicant.

U. S. DEPARTMENT OF COMMERCE
Patent Office
Washington

NOTICE OF ALLOWANCE

The application for patent identified below has been examined and found allowable for issuance of Letters Patent.

Filing Date 03/04/57

Serial No. 643711

No. Claims Allowed 4

Examiner L. J. Dembo

Applicant Scoggin, Baxter I., Jr., Kansas City, Mo.

Assignee Cook Chemical Company, mesne

Title of Invention Pump-type liquid sprayer having hold-down cap

MAILED Nov. 20, 1958

With the allowance of the application the final fee becomes due. This fee is thirty dollars ($30) plus one dollar ($1) for each claim allowed in excess of twenty (20) and must be paid within 6 months from the date of this notice. Failure to remit the final fee will result in the patent being withheld from issue.

As a convenience in remitting this fee, use of the enclosed Form POL-85a is suggested. The final fee will not be received from anyone other than the applicant, his assignee or attorney, or a party in interest as shown by the records of the Patent Office.

If it is desired to have the patent issued to an assignee or assignees, an assignment, together with the fee for recording the same, must be filed in this Office on or before the date of payment of the final fee.

The patent will be issued and forwarded within approximately two months after receipt of the final fee.

By direction of the Commissioner.

C. Earl Hovey
Federal Reserve Bank Bldg.
Kansas City 6, Mo.

375

U. S. Department of Commerce
Patent Office

3046-135 B

FINAL FEE TRANSMITTAL

...ce in transmitting final fees to the Patent Office. When properly completed it may be used ...ner. Respondents will note and fill in items numbered 1 thru 6 below. The Final Fee Receipt, ...e address appearing in box at lower left of this form. If desired, use the reverse side of your Notice ...when completing this form.

...PATENTS is requested to apply the accompanying fee to the case identified below, and deliver the patent

...1, 1958 (Nov 28 1958)
Date

Attorney, Agent or Applicant

...will not be received from other than the applicant, his assignee, or attorney, or a party in interest as shown by the records of ...Office. Final fees will not be applied to pending applications.

	FILING DATE	SERIAL NO.	NO. CLAIMS ALLOWED	EXAMINER
	09/04/57	683711	4	L. J. Dombo
APPLICANT	Scoggin, Dexter I., Jr., Kansas City, Mo.			MAILED Nov. 20, 1958
ASSIGNEE	Cook Chemical Company, Kansas			
TITLE OF INVENTION	Pump-type liquid sprayer having hold-down cap			Notice of Allowance Date

2. DEFERMENT: (Indicate below if desired)

Def-2655 (519 9-57) ...814.3

3. FEE ENCLOSED

$ 30.00

S/N 683,711

4. Assignee: (If assigned and name does not appear in the corresponding space above)

MAILING INSTRUCTIONS

...ote—The office will send the patent to the address entered in stub at left below unless you direct otherwise. Use the spaces pro-...vided to indicate any changes which affect the delivery of the patent.

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☐ Patentee

☐ Assignee

☐ Associate Attorney (See specific authorization in file)

☐ Change of address—Attorney

The address of the person checked above is typed in Item 6 below.

6

37

PAT D ☐

376

In Re Patents

United States District Court

for the

WESTERN DISTRICT OF MISSOURI

MISSIONER OF PATENTS,
Washington 25, D. C.

WESTERN DIVISION (Kansas City)

SIR:

In compliance with the Act of July 19, 1952 (66 Stat. 814; 35 USC 290), you are advised that there was filed on the 27th day of April, 1959, in this court an action, No. 12349, entitled:

Name Calmar, Incorporated, Plaintiff,

Address Los Angeles, California

versus

Name Cook Chemical Company, Defendant,

Address Kansas City, Missouri

brought upon the following patents:

	PATENT NO.	DATE OF PATENT	PATENTEE
1	2,870,943	Jan. 27, 1959	Baxter I. Scoggin
2			
3			
4			
5			

In the above-entitled case, on the day of , 19 , the following patents have been included by (insert amendment, answer, cross bill, or other pleading):

	PATENT NO.	DATE OF PATENT	PATENTEE
1			
2			
3			
4			
5			

In the above-entitled case the following decision has been rendered or judgment issued:

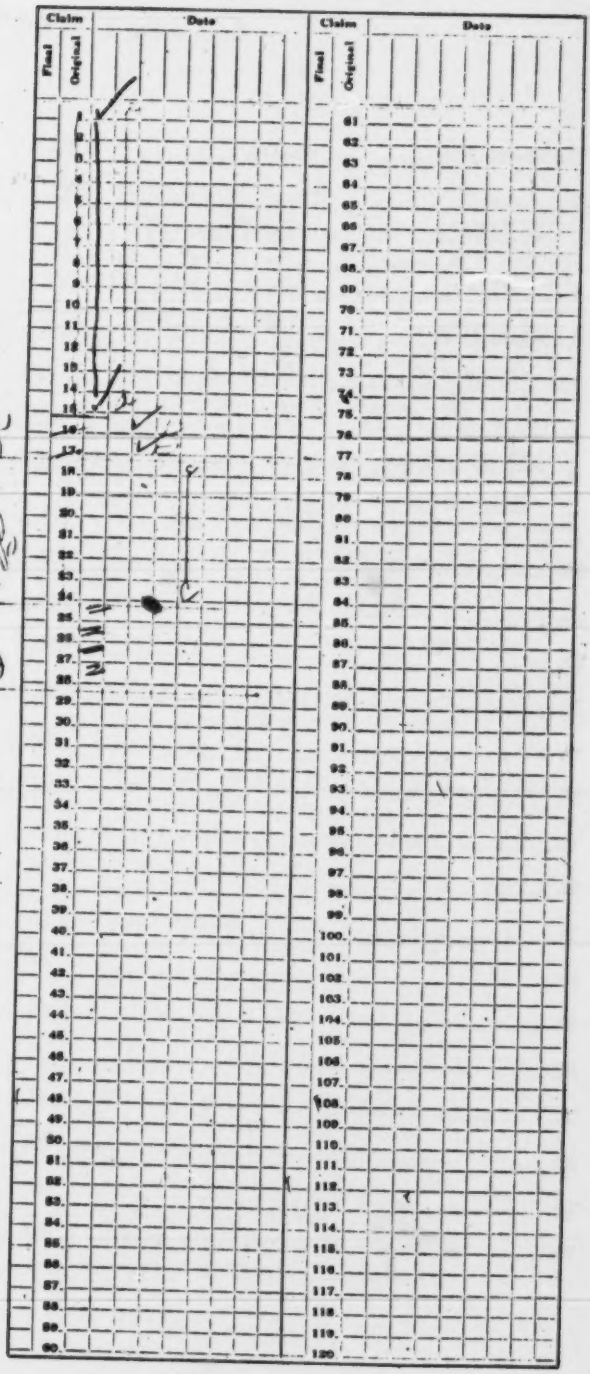
Clerk.

Date , 19

By Virgil B. Cook, Deputy Clerk.

377

INDEX OF CLAIMS



SEARCHED

Class	Sub	Date	Ex'r
222	192		
	394		
137	382		
	382.5	11/5/57	THOMAS
222	538		
—	542	8/5/58	HARRIS
722	320		
	321		

2586,687 222/321
1,147,712 222/320

SYMBOLS

R	Rejected
=	Allowed
– (Through numeral)	Canceled
+	Restriction requirement
N	Nonelected invention or species
I	Interference
A	Appeal

STATUS

36

19—11372-6

378

CONTENTS

1. Application ____ papers.
2. Print Nov. 19, 1957
3. REJECTION NOV 5 - 1957
4. Amdt. A May 1, 1958
5. REJECTION OCT 1 1958
6. Amdt B Nov. 3, 1958
7. Sup. Amdt C Nov. 19, 1958
8. LIST OF REFERENCES
9. Notice of Suit June 27, 1959
10. ____
11. ____
12. ____
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49. ____
50. ____

[1064] PLAINTIFF'S EXHIBIT F.

February 6, 1962

Claim 1 of Scoggin 2,870,943

In a closure assembly for open-top container having a perforated cap over said open top thereof, mounting a spray unit including a barrel provided with a tubular extension passing coaxially upwardly through the perforation in said cap, a plunger reciprocably carried by the barrel and normally extending therebeyond and a spray head on the upper end of the plunger above said extension, the combination with said spray unit of an annular retainer telescoped over and secured to the extension above said cap and provided with external, circumferentially disposed screw threads and an annular, continuous segment at the upper part of the retainer above said screw threads, and a cup-shaped hold-down member housing the head and holding the plunger depressed at substantially the innermost path of travel thereof within the barrel, said member being provided with internal screw threads complementally engaging said screw threads on the retainer and having an internal, circumferentially extending, continuous shoul-

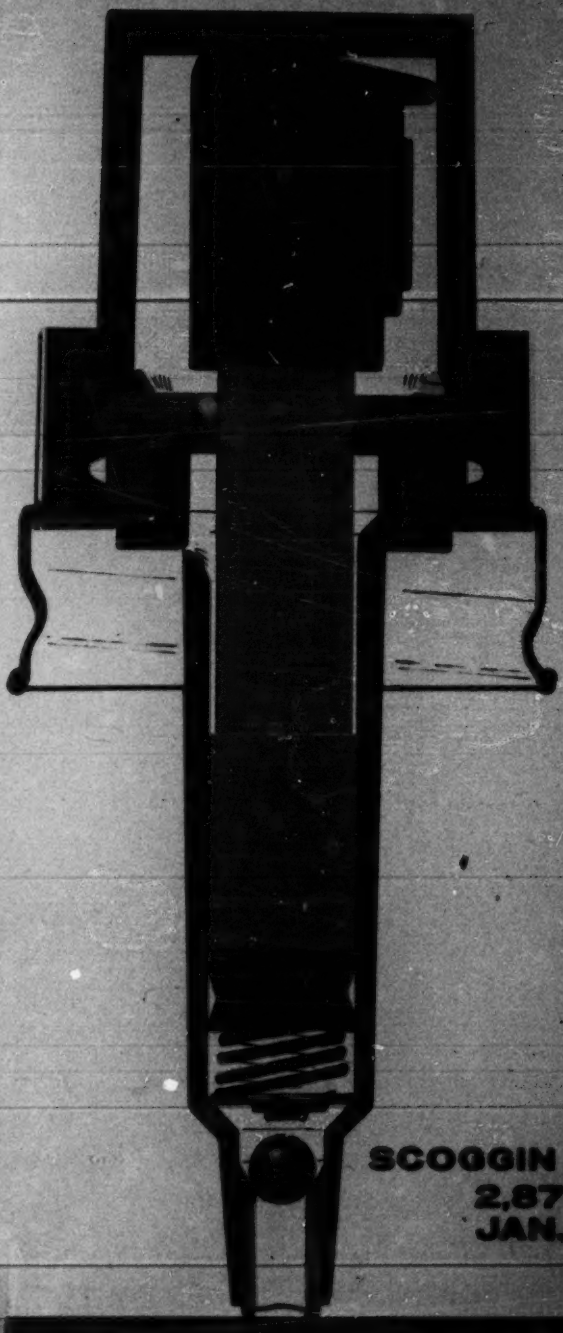
Cancelled Claim 18 of Scoggin Application

In a closure assembly for an open-top container having a perforated cap over said open top thereof, mounting a spray unit including a barrel, an extension passing coaxially through the perforation in said cap, a plunger reciprocably carried by the barrel and normally extending therebeyond and a spray head on the upper end of the plunger above said extension, the combination with said spray unit of an annular retainer secured to and surrounding the extension above said cap and provided with external, circumferentially disposed screw threads and an annular, continuous segment at the upper peripheral edge of the retainer above said screw threads, and a cup-shaped cap member housing the head and holding the plunger depressed at substantially the innermost path of travel thereof within the barrel, said member being provided with internal screw threads complementally engaging said screw threads on the retainer and having an internal, circumferentially extending, continuous shoulder disposed to

Claim 1 of Scoggin 2,870,943	Cancelled Claim 18 of Scoggin Application
der disposed to engage said segment around the entire periphery thereof and thereby present a liquid-tight seal located between the spray head and said threads on the retainer and said member respectively,	engage said segment around the entire periphery thereof and thereby present a liquid-tight seal located between the spray head and said threads on the retainer and said member respectively,
said shoulder being spaced from the lower annular peripheral edge of the member a distance at least slightly less than the distance from that portion of said segment normally engaged by said shoulder, to the proximal upper surface of the cap whereby said lower edge of the member is maintained out of contacting relationship with the cap when the member is on the retainer in a position with said shoulder in tight sealing engagement with the segment.	said segment and the shoulder being disposed to maintain the lower peripheral margin of the member out of engagement with the cap when the segment and shoulder are in sealing inter-engagement.

PLAINTIFF'S EXHIBIT G 381

G



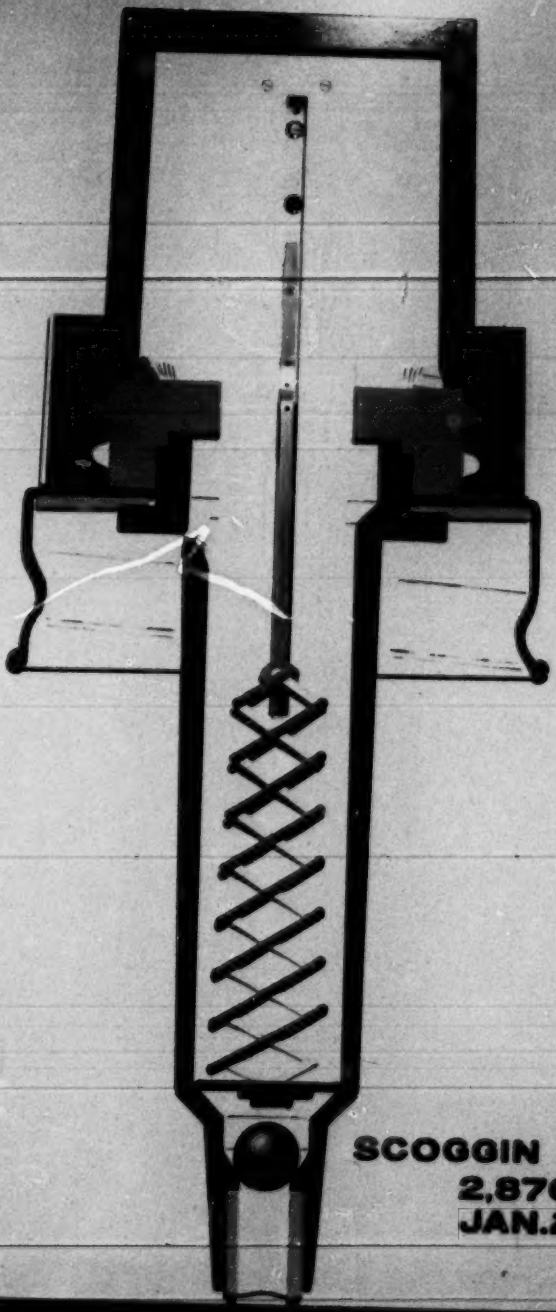
SCOGGIN PAT. NO.
2,870,943
JAN. 27, 1959

P-G

PLAINTIFF'S EXHIBIT G-1

383

G



SCOGGIN PAT. NO.
2,870,943
JAN. 27, 1959

P-G1

PLAINTIFF'S EXHIBIT H

385

Aug. 16, 1955 J. G. LIVINGSTONE 2,715,480

CONTAINER ADAPTER PROVIDED WITH POURING SPOUT, DRIP RETURN AND CAP

Filed March 9, 1953

2 Sheets-Sheet 1

FIG. 1

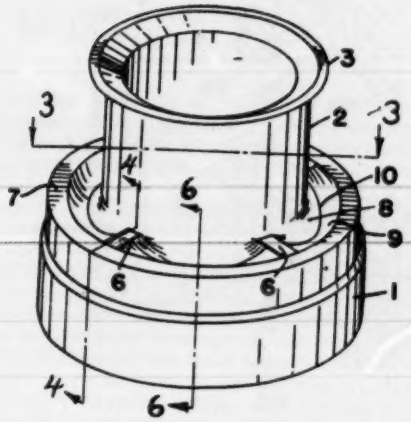


FIG. 2

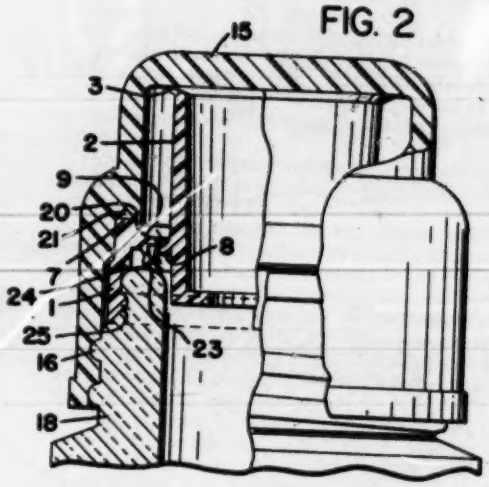


FIG. 3

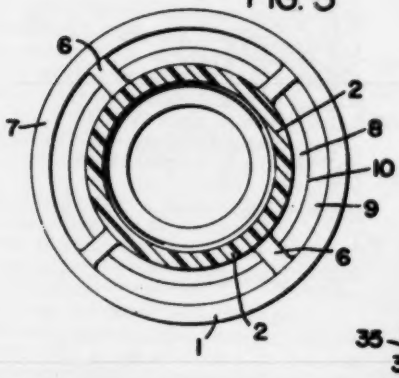
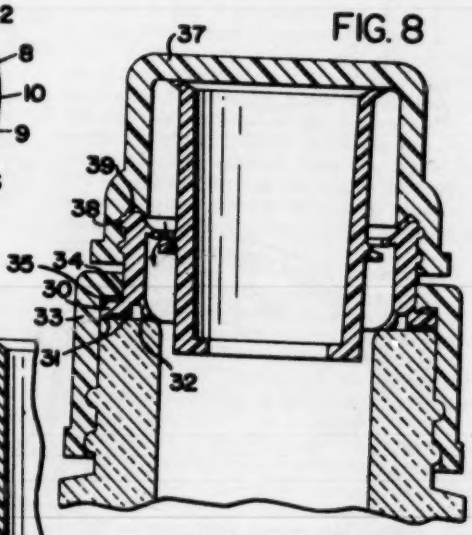


FIG. 8



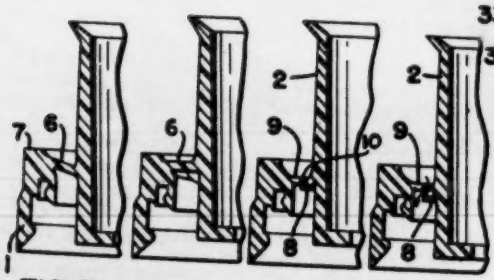


FIG. 5 FIG. 4 FIG. 6 FIG. 7

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by Gordon P. Mead

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386

Aug. 16, 1955 J. G. LIVINGSTONE 2,715,480

CONTAINER ADAPTER PROVIDED WITH POURING SPOUT, DRIP RETURN AND CAP

Filed March 9, 1953 2 Sheets-Sheet 2

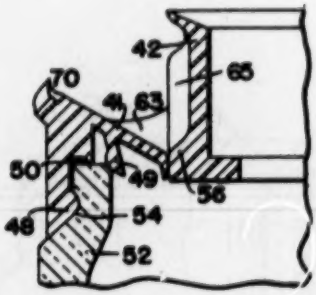


FIG. 12

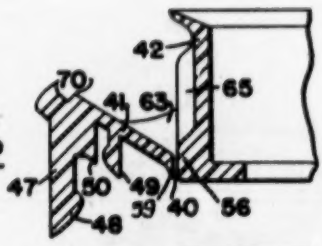


FIG. 10

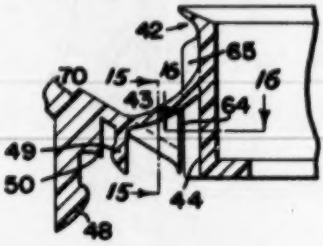


FIG. 11

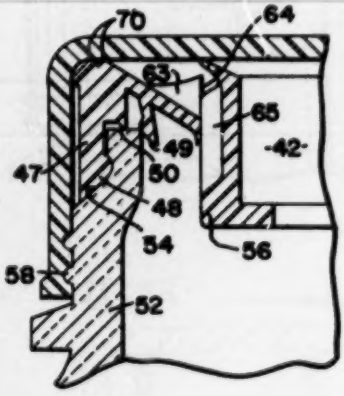


FIG. 13

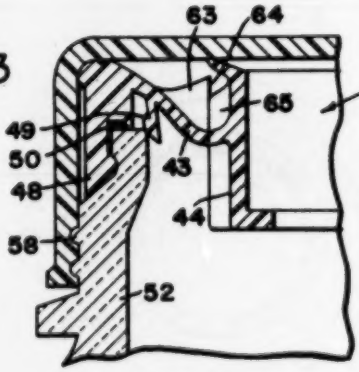


FIG. 14

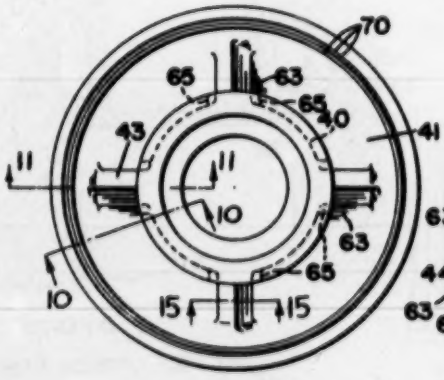


FIG. 9



FIG. 15



FIG. 16

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337

United States Patent Office

2,715,480
Patented Aug. 16, 1955

REISSUED
May 29, 1956
RE. 24,159

2,715,480

CONTAINER ADAPTER PROVIDED WITH POURING SPOUT, DRIP RETURN, AND CAP

Jay G. Livingstone, Akron, Ohio

Application March 9, 1953, Serial No. 341,288

6 Claims. (Cl. 222—111)

This invention relates to an adapter for a bottle or other container. It is made of a plastic. The adapter is provided with means for attaching it to the container and with a spout having a pouring lip. There is a channel below the lip which runs down the outer surface of the lip and spout. The bottom of the channel is slit in one or more places so that when downward pressure is applied to the spout it is depressed and the slits open up and provide openings through which liquid which has collected in the channel drains back into the container. The slits may be at the inner edge of the channel adjacent the spout, or at its outer edge near means for attaching the adapter to the container, or at some location in between. The return of liquid to the bottle is preferably accomplished by fastening a cap over the adapter in such a way that it depresses the spout so that the slits open.

The invention will be further described in connection with the accompanying drawings, in which—

Fig. 1 is a view in perspective of the adapter;

Fig. 2 shows the adapter on a bottle with a cap fastened to the bottle over the adapter which presses the spout down into the bottle sufficiently to open the slits located in the channel which surrounds the spout;

Fig. 3 is a plan view of the adapter on the line 3—3 of Fig. 1;

Fig. 4 is a section through a bridge portion of the adapter between slits on the line 4—4 of Fig. 1;

Fig. 5 is a similar section but with the spout depressed;

Fig. 6 is a section through a slit portion of the adapter on the line 6—6 of Fig. 1;

Fig. 7 is a similar section but with the slits open;

Fig. 8 is a view of a slightly modified form of adapter fastened to a bottle with a cap with an open top and covered by a second cap which is fastened to the adapter and depresses the spout thereof so as to open the slits therein;

Fig. 9 is a plan view of a modified type of adapter in which the slits are adjacent the outer wall of the spout, the bridges are longer and slope upwardly to the spout, and the spout is thin where the bridges are attached to make its walls more flexible;

Fig. 10 is a section on the line 10—10 of Fig. 9;

Fig. 11 is a section on the line 11—11 of Fig. 9;

Fig. 12 is a section similar to the section of Fig. 10, but with the adapter on a bottle;

Fig. 13 is a section similar to those shown in Figs. 10 and 12, but with a cap on the bottle and the spout of the adapter depressed, opening the slits;

Fig. 14 is a section similar to that shown in Fig. 13 but on the same line as the section of Fig. 11;

Fig. 15 is a section, partly broken away, on the line 15—15 of Figs. 9 and 11; and

Fig. 16 is a section on the line 16—16 of Fig. 11.

The adapter shown in the drawings is provided with a skirt portion 1 which fits over the top of a bottle or other container. It is to be understood that instead of being provided with a skirt portion the base of the adapter

may be in the form of a stopper which fits into the neck of a bottle or the like, or the base may be threaded internally or externally to screw on to the neck of a bottle, or the base of the adapter may be of any other design.

Located centrally of the adapter is the spout 2 with the pouring lip 3 at the top thereof. This lip extends around the top of the spout so that liquid can be poured from it when the bottle or container is tilted in any direction.

The spout 2 is supported from the skirt 1 by the bridges 6. As clearly shown in Fig. 5, these bridges 6 are located below the outer wall 7 above the skirt 1. This wall forms a tight seal with the cap by means of a groove in the undersurface thereof, as will be explained in what follows.

Between the bridges 6 are the slit depressed areas, one portion 8 of which is attached to the spout, and another portion 9 of which is attached to the skirt. Between these portions are the slits 10. As best shown in Fig. 6, the portion 8 is preferably offset downwardly somewhat from the portion 9, although the portions 8 and 9 contact one another so that when the container is tipped for pouring no liquid escapes between the two. These portions, or at least the lower of them, are preferably curved downwardly so that the pressure of liquid against their undersurface when the container is tilted forms a seal between them so that no liquid escapes.

When pressure is applied to the top of the spout, as when a cap is fastened down over it and the spout is pressed downwardly with respect to the skirt (as illustrated in Figs. 2, 5, 7 and 8), the portions 8 of the channel are offset downwardly from the portions 9, opening the slits 10, and any liquid which is collected in the channel drains down through the slits into the bottle. The portions 8 and 9 are maintained in this offset position as long as pressure is applied to the top of the spout. Thus, if the bottle is upset with the cap fastened over the spout, liquid may run out through the slits between these offset portions but it will be retained under the cap and will not spill out of the cap enclosure. When the bottle is righted prior to removing the cap any liquid which has thus escaped from the bottle into the cap will be returned through the slits to the bottle. When the pressure on the spout is released by removal of the cap, the portions 8 return into sealing engagement with the portions 9.

Figure 2 shows the cap 15 screwed onto the threads 16 on the outside of the neck 18 of a bottle. The threads cover a sufficient vertical area on the outer surface of the bottle so that when the cap is screwed down on these threads the top of the cap depresses the spout sufficiently to open the slits 10 between the portions 8 and 9 of the channel. Figure 2 shows the spout depressed and the slits open.

The cap is of the type in which there is an annular tongue 20 which projects downwardly from its inner surface. The outer wall of this tongue is beveled inwardly and downwardly and meets the downwardly and outwardly slanting wall of the cap to form the V-shaped groove 21 which fits over the top of the wall 7 of the adapter. The adapter is made of flexible plastic and the top of the wall 7 is squeezed by this V-shaped groove 21 so that there is a liquid-tight seal formed all around the top of the adapter. This prevents leakage from the cap enclosure when the capped bottle is upset.

On the undersurface of the portion 9 of the channel around the spout is the flexible tongue 23 which is pressed against the top edge of the neck of the bottle and makes a liquid-tight seal with it. There is also the annular pointed tongue 24 of somewhat larger diameter which makes a further seal with this top edge of the bottle. The adapter shown is of the slip-on type in which

the bead 25 fits into a complementary indentation around the top of the bottle. Between the tongues 23 and 24 is a tightly sealed air pocket in which air is trapped at a pressure greater than atmospheric, and this prevents liquid escaping from the bottle when the bottle is tilted.

The bottle fitted with this adapter and cap is liquid tight. It can be tipped over and although the liquid may then run into the cap through the slits 10, as soon as the bottle is returned to the upright position all of this liquid drains back into the bottle.

As soon as the cap is removed from the bottle the depressed spout assumes its original position. This closes the slits 10 and prevents any liquid from escaping through the slits when the bottle is tipped for pouring. After pouring any liquid dripping from the lip 3 or running down the outside of the spout collects in the channel. It can be drained into the bottle by manually depressing the spout to open the slits 10. Whenever the cap is replaced any liquid in the channel is automatically returned to the bottle.

Figure 8 illustrates a modified type of adapter. The bridges, channel and slits are identical with those previously described. The adapter is of flexible plastic. The flange 30 which extends outwardly from its base is designed with two annular contact points 31 on its undersurface. These and the tongue 32 form an air pocket similar to that formed by the tongues 23 and 24 of Fig. 2 and form a tight seal.

When the hard cap 33 is screwed on to the bottle it presses down on the flange 30 and holds the adapter tightly to the top of the bottle. The annular tongue 34 on the cap 33 presses down on the top of the flange between the contact points 31 and seals these tightly against the top of the bottle. This is aided by the upwardly projecting outer edge 35 of the flange 30 which presses against the undersurface of the cap 33 and forces the tongue 31 on the outer edge of the flange 30 against the top edge of the bottle.

The cap 37 may be of hard plastic or flexible plastic. It is threaded onto the external threads 38 of the adapter. The V-shaped groove 39 in the undersurface of the cap operates in the same manner as the groove 21 of the cap 15 of Fig. 2, making a tight seal with the top of the wall of the adapter.

In the adapter shown in Figs. 9–16 the slits 40 are at the inner edge of the channel 41 adjacent the spout 42. The bridges 43 are long and extend upwardly. The spout is thin above the bridges, and it is grooved at 44 below the bridges, making it thin and flexible where the bridges are attached to it. The bridges are preferably of uniform thickness, as shown in Fig. 15, so that they flex readily. The undersurface of the skirt 47 of the adapter is provided with a bead 48 at its bottom edge, a flexible annular tongue 49 and an annular pointed bead or tongue 50. Figure 12 shows how these cooperate with the bottle 52 in order to form a tight seal. The bead 48 fits snugly into the groove 54 in the bottle. The tongue 49 presses against the inner edge of the top of the neck of the bottle and this throws the inner edges of the channel 41 up to make tight contact with the portions 56 of the base of the spout which bulge out between the bridges. The bead or tongue 50 presses against the top surface of the bottle. The tongue 49 is flexible and makes a tight seal with the inner edge of the top of the bottle even though the thickness of the neck of the bottle varies. The beads 50 and 48 are so spaced as to make a tight fit between the top and the outer surface of the neck of the bottle.

Figure 10 shows that when the adapter is not on a bottle there is a slight opening at the slit 40. When the adapter is placed on a bottle, as in Fig. 12, the tongue 49 is pressed inwardly and this closes the slit 40 by pressing the inner edges of the channels 41 against the outer surfaces of the portions 56 of the spout 42.

Figures 13 and 14 illustrate how the spout is depressed and the slits 40 are opened up when the cap 57 is screwed onto the threads 58 of the bottle 52. The cap is shallow and applies pressure uniformly around the lip of the spout. The inner edge of each channel is provided with a tongue 59. The tip of each tongue is curved outwardly to guide the inner edge of the channel over the protruding base portion 56 of the spout between the bridges when the spout rises as the cap is removed. Thus, when the cap is removed the adapter returns to the position illustrated in Fig. 12.

The bridges must be higher than the channel in order to permit liquid which drops on their upper surface to drain over their sides, down into the channel. By providing long, sloping bridges it is possible to depress the spout to a greater extent than is possible with the design of adapter shown in Figs. 1–7. The long bridges 43 of the adapter of Figs. 9–14 permit the spout to be depressed sufficiently to permit drainage of liquid from the channel into the bottle before the threads on the cap make contact with the threads 58 on the bottle.

There is a wall 63 at each edge of each channel portion 41, adjacent the bridges. Figs. 10 and 11 illustrate the adapter, as molded, and there is a slight space between the edge 64 of each wall 63 and the ribs 65 on the spout on each side of each bridge. When the adapter is put on a bottle, as in Fig. 12, the channel is lifted sufficiently to close this space. When the bottle contains liquid and is tilted for pouring, these walls prevent the liquid from running out from between the bridges and the channels. When the spout is depressed, the edges 64 slide up on the ribs 65, as illustrated in Figs. 13 and 14, and the spaces between the inner edges of the channels and the bulged portions 56 at the base of the spout open and permit any liquid on the channels to drain into the container.

The edges of the bridges come to a point, as best illustrated in Fig. 15. They make line-contact with the outer surfaces of the walls 63 and form a liquid-tight seal which prevents the escape of liquid from within the bottle, when the bottle is tilted for pouring. When the spout is raised, the top of each wall 63 contacts the edge of the adjacent bridge, as shown in Fig. 15. The bridges slope to each side so that any liquid on them, whether because of dripping from the lip or for any other reason, drains over the top of the adjacent wall 63 when the spout is raised, and down into the channel. Then, when the spout is depressed, this liquid runs over the inner edge of the channel, into the container.

The top of the outer edge of the adapter is provided with the beads 70 which press against the inner surface of the cap when the cap is screwed down tight, and prevent any leakage of liquid from the bottle to the outer surface of the adapter beyond the channel. When the cap is screwed down tight the slits 40 are open and if the bottle is then upset liquid drains through these slits against the inner surface of the top of the cap. The beads 70 prevent its going beyond this. The several beads 70 at different locations insure sealing contact between the adapter and caps of different design.

It is often desirable to assemble the adapters in the caps at a bottling works, or before shipment to the bottling works, so that after the bottles are filled the only operation required to close them is to screw the caps on to them. The tight fit of the beads 70 in the caps serves to hold the adapters in the caps before applying them to the bottles. This sub-assembly can be made at any convenient time and place. After the bottles are filled, it is only necessary to screw the caps in place. In doing this the beads 48 on the adapters automatically slip into place in the grooves 54, and no additional operation is necessary to fit the adapters on the bottles.

The drawings illustrate how the invention is applicable to adapters of different designs with different types of caps. The construction of the channel and slits may be varied to suit requirements. The adapter shown is de-

signed to be molded of polyethylene or the like, the shrinkage of which during molding is dependent on the thickness of different parts of the molded product. Thus, by making the top of the outer wall of the adapter shown in Figs. 9–16 of greater material thickness than the portions of the adapter within this wall, these portions within the wall are brought together as the portion of greater material thickness shrinks and the inner edge of each tongue 59 is drawn inwardly into contact with the base of the spout. This narrows or eliminates the space 40 (Fig. 10) between each tongue and the spout occupied by the mold during the molding. It also draws the outer surface of each wall 63 closer to the edge of the bridge adjacent to it. Thus by providing a bulk of the plastic around the edge of the adapter, edges which are separated by the thickness of the mold during molding are brought closer to one another.

It is possible to form the spout and the surrounding portion of the adapter as separate units of thermosetting material, with the slit located between them. The adjoining edges of the two units may be formed by interlocking fingers. The two units may be united by a spring of metal or the like which will force the spout upwardly when there is no downward pressure on it, and bring the interlocking fingers into sealing contact between the units.

The invention is defined in the claims which follow.

What I claim is:

1. An adapter of flexible plastic for a container, the adapter being provided with a spout for pouring liquid therethrough, a wall around the spout, a channel between said wall and the spout for the collection of liquid dripping from the spout and liquid running down the outer wall of the spout, and a slit in the channel dividing at least a part of the channel into one part that adheres to the spout and another part that adheres to the wall, whereby when the spout is depressed with respect to said wall the slit is opened and liquid in the channel drains therethrough.

2. The adapter of claim 1 in which the highest point of the spout is higher than the wall.

3. The adapter of claim 1 in which the pouring lip extends around the top of the spout and the channel is provided with a plurality of slits arranged substantially uniformly around the spout.

4. The adapter of claim 1 in combination with a cap which covers the spout and the lower portion of which is releasably sealed to the outer surface of said wall with its undersurface contacting the top of the spout and depressing the same with respect to the wall, whereby the slit is opened.

5. The adapter of claim 1 in combination with (1) a container and affixed to an opening therein and (2) a cap which covers the spout with the lower portion thereof releasably sealed to the outer surface of the container and with its undersurface contacting the top of the spout and depressing the same with respect to the wall whereby the slit is opened.

6. An adapter of flexible plastic for a container, which adapter includes a cylindrical spout with a pouring lip extending completely around the top thereof, means at the bottom of the adapter for attaching the adapter to a container, flexible bridges between the spout and the attaching means and a channel extending between each two bridges and extending from the spout to the attaching means, and a slit in each channel extending substantially from one bridge to the next and which is opened when the spout is depressed with respect to the attaching means.

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PLAINTIFF'S EXHIBIT I

390

Sept. 18, 1956 J. G. LIVINGSTONE 2,763,402

ADAPTER

Filed June 10, 1952 2 Sheets-Sheet 1

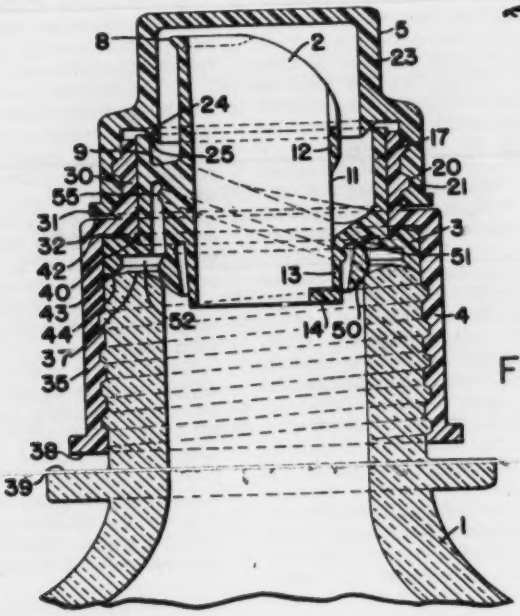


FIG. 1

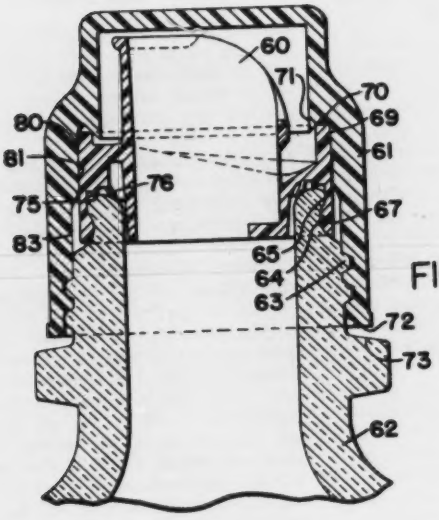
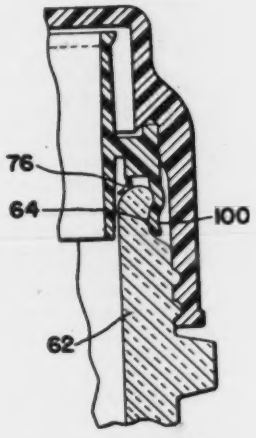


FIG. 2

FIG. 5



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391

Sept. 18, 1956 J. G. LIVINGSTONE 2,763,402

ADAPTER

Filed June 10, 1952

2 Sheets-Sheet 2

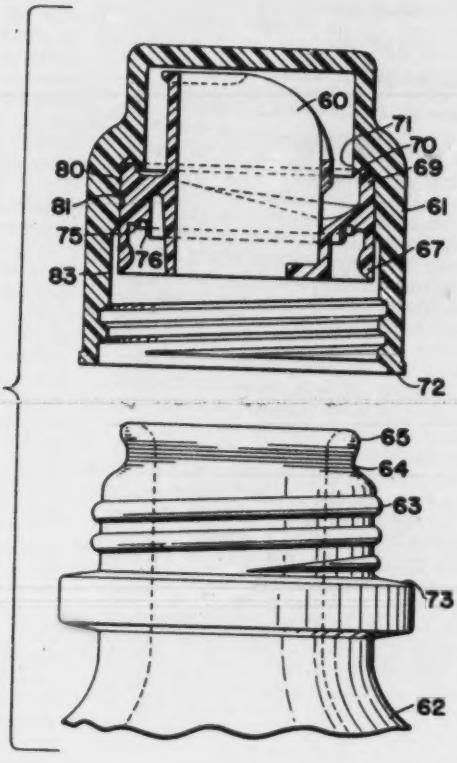


FIG. 3

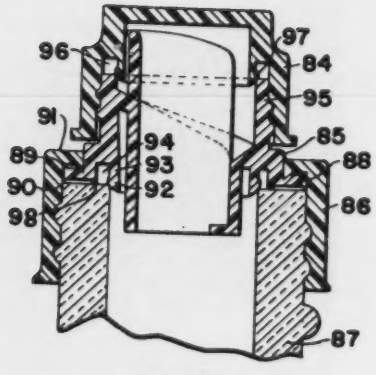


FIG. 4

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United States Patent Office

2,763,402
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2,763,402

ADAPTER

Jay Gould Livingstone, Akron, Ohio

Application June 10, 1952, Serial No. 292,646

19 Claims. (Cl. 222—109)

This invention relates to a spout adapter or the like to be used on a bottle or other container with a tubular opening. The invention includes means for holding the adapter on the bottle and several such means are disclosed. Although the specification and claims refer more particularly to the use of the adapters on bottles, they may be used equally well on metal containers, for example those with threaded openings closed by threaded caps, etc. The invention includes a method of assembling a bottle, cap and adapter. The preferred form of adapter which is illustrated includes a run-back channel for returning to the bottle or other container any liquid which drips or runs down from the spout after pouring.

The adapter is formed of flexible resilient plastic. It may be made of polyethylene, etc. Stiffer plastics such as polystyrene, etc. may be used, and with such stiffer plastics a gasket may be used adjacent the bottle whereas with polyethylene no gasket is necessary. Polyethylene is preferred. The bottle or other container is rigid and may be made of glass, porcelain, metal, plastic, etc. A preferred form of adapter is designed to produce an annular air pocket around the top edge of the bottle between inner and outer sealing means on the adapter which contact the bottle in radially spaced annular areas. Means for forming such an air pocket is disclosed in the drawings and will be discussed in what follows.

The adapter may be held on the bottle by a relatively rigid cap. This cap may be made of glass, porcelain, plastic, metal, etc. This cap is preferably provided with internal threads which are screwed onto external threads at the mouth of the bottle. Several such caps are shown in the drawings and will be described in what follows. The cap may be open at the top, with the top of the adapter protruding through it. Such caps are often referred to herein as open caps. Other caps which enclose the top of the adapter are often referred to herein as closure caps.

A preferred adapter is provided with a tongue which rests on the top of the bottle and is squeezed by the cap which holds the adapter on the bottle. Different forms of such a cap are shown in the drawings and will be discussed in what follows. An open cap may be provided with external threads which fits over the adapter and holds it to the bottle and onto which is screwed a closure cap which encloses the top of the adapter.

In one preferred form of the invention a relatively rigid closure cap is provided which encloses the top of the adapter and screws onto external threads on the bottle. The adapter and cap are so designed that when the adapter is inserted in the cap it is retained in the cap even when the cap is positioned to be screwed down onto a bottle. In assembling the adapter and cap on a filled bottle, the adapter is first put in the cap, and then the cap is screwed onto the bottle. Thus the three are conveniently assembled in a single operation. The adapter employed in this way is preferably provided with snap-on means so that it will fasten itself onto the bottle as the cap is screwed onto the bottle. Thereafter,

when the cap is unscrewed the adapter remains fastened to the bottle and is not removed with the cap. This type of adapter is illustrated in the drawings and will be more particularly described in what follows.

In the drawings—

Fig. 1 is a section through a bottle or the like provided with an externally threaded neck, and shows an adapter held thereon by a relatively rigid open cap with external threads onto which a closure cap is threaded;

Fig. 2 is a cross section through a bottle showing a snap-on adapter inside a relatively rigid cap which is threaded onto a bottle or the like;

Fig. 3 is an exploded view of the assembly shown in Fig. 2, illustrating the adapter held in the cap as the cap is about to be screwed onto the bottle or the like;

Fig. 4 is a section through a bottle having an adapter held thereon by a relatively rigid open cap, and shows a closure cap threaded onto the adapter; and

Fig. 5 is a detail of a modified form of the adapter shown in Figs. 2 and 3.

In the drawings Fig. 1 shows a rigid bottle 1 made of glass, earthenware, plastic or the like. The adapter 2 is of flexible plastic such as polyethylene, etc. This adapter is provided with the annular flange 3 which is held to the bottle by the relatively rigid open cap 4 of plastic or the like. The rigid closure cap 5 is threaded onto the cap 4.

There is an opening through the adapter through which liquid may be poured. The adapter is provided with the pouring lip 8. Any liquid dripping from the pouring lip or running down the outside of the adapter after pouring, is caught in the channel 9. This channel encircles the opening through the adapter and drains from the front to the rear where liquid running back through the channel is returned to the bottle through the opening 11 between the wall portion 12 and the bottom cylindrical portion 13 of the adapter from which the baffle 14 projects. The baffle limits the amount of liquid that can be poured through the adapter so that none will run out through the opening 11, and performs such other functions as providing a smooth flow of liquid from the adapter, etc. The wall 17 rises from the floor of the channel and retains within the channel any liquid being returned to the bottle.

The wall 17 has a further function. The closure cap 5 is threaded onto the open cap or hold-down ring 4 at 20. The apron 21 which contains internal threads is of greater diameter than the dome 23. Radially inward from the apron 21 and preferably at the bottom of the dome is the lip 24, the outer surface 25 of which tapers inwardly. As the closure cap 5 is screwed onto the open cap 4, the upper edge of the flexible wall 17 of the adapter is squeezed between the wall 30 of the open cap 4 and the lip 24 on the closure cap 5. The surface 25 is sloped so that the top of the wall 17 is squeezed as the cap 5 is turned down on the threads 20 on the open cap. In this way a liquid-tight seal is formed over the adapter which prevents leakage of any liquid from the run-back channel or the bottle in the event the bottle is turned over. It will be noted that the bottom surface 31 of the closure cap 5 does not seat against the shoulder 32 on the cap 4 because this would limit the amount that the cap 5 could be tightened against the wall 17. As shown, the cap 5 is tightened until an adequate seal is formed with the wall 17.

The externally threaded wall 30 of the cap 4 is of smaller diameter than the apron 35 which is screwed onto the bottle. This necessitates the shoulder 32 which extends outwardly above the flange 3 of the adapter and presses it against the end of the bottle. It will be noted that the lower surface 38 of the cap 4 does not seal against the flange 39 of the bottle, but it is possible to

screw the cap 4 onto the bottle any desired distance to form a tight seal between the flange and the end of the bottle.

The cap 4 is provided with a lip 40 at the base of the wall 30. This lip presses against the flange 3 at about the center of the end of the bottle and assists in making a tight seal between the flange 3 and the end of the bottle. It is noted that in the preferred form illustrated in Fig. 1, the top surface of the flange is not flat but the outer edge 42 is higher than the surface located immediately inwardly from it. This tends to apply pressure to the downwardly projecting portion or tongue 43 at the outer edge of the lower surface of the flange. This portion 43 is provided with the downwardly and outwardly slanting surface 44 which makes contact with the outer rim of the end of the bottle. As the cap 4 is screwed on the bottle and the flange 3 is pressed against its end, this tapering tongue 43 is squeezed between the edge of the bottle and the inner surface of the cap, and makes a tight seal.

A tight seal is likewise formed at the inner rim of the end of the bottle by the downwardly projecting annular tongue 50. The inner wall of the tongue is substantially perpendicular when no pressure is applied to it. The outer surface of the bottom tapers downwardly and inwardly. The tongue is relatively thin at the neck 51 where it joins the adapter. This relatively thin portion between the adapter and the portion which contacts the inner rim of the end of the bottle permits the tongue to flex inwardly, as shown, when pressure is applied to it. Such flexing occurs without distortion of the adapter because the thin neck accommodates itself to the pressure applied.

Thus the adapter forms two independent seals with the end of the bottle by means of the tongues 43 and 50, and there is an air pocket 52 between these. One of these seals is at the outer rim of the end of the bottle and the other is at the inner rim. As the adapter is pressed onto the end of the bottle, the air in this pocket is compressed. The volume of the pocket is ordinarily so much less than the space in the top of the bottle, that the air in the pocket 52 is under greater pressure than any air or gas in the bottle. This tends to prevent any leakage between the tongue 50 and the end of the bottle. Thus, the seal at the end of the bottle is triply tight, being secured by the tongues 43 and 50, and in addition, by the air pocket 52 which contains air under pressure.

In the manufacture of the adapter, the tongue 50 serves another purpose. This tongue and the bead 55 assist the bottom core of the mold in pulling the adapter out of the mold cavity.

The adapter shown in each of the drawings is a flexible adapter and forms an annular air pocket at the end of the bottle to which it is affixed, and also forms a seal on each side of the air pocket. In each construction the air in the pocket will be compressed. As illustrated, the seals need not be at the inner and outer edges of the end of the bottle, but one or both may be intermediate the edges. Likewise, as shown, such an air pocket may be formed on bottles having ends of different contours.

The flexible adapter 60 of Fig. 2 may be made of polyethylene, etc. The relatively rigid closure cap 61 may be of any hard plastic, metal, etc. The adapter and cap and rigid bottle 62 are all designed with a view to assembling the adapter and cap on the bottle in the manner illustrated in Fig. 3. The bottle is provided with external threads 63 onto which the internal threads in the cap 61 are screwed. The portion of the neck of the bottle from which the threads 63 project is of larger external diameter than the portion above it which includes the groove 64 and the protruding portion 65 above the groove. These are designed to receive the snap-on tongue 67 which projects downwardly from the adapter and hold it and the adapter on the bottle.

The adapter is of the general run-back type illustrated in Fig. 1, although the proportions of the various parts are not the same as in Fig. 1.

The upper end of the flexible wall 69 which surrounds the run-back channel fits into the groove 70 in the rigid cap. The surface 71 of this groove tapers downwardly and inwardly so that as the cap is tightened onto the bottle, the top of the flexible wall is squeezed in the groove, and a tight seal is formed. It will be noted that the bottom edge 72 of the cap does not contact the shoulder 73 on the bottle, but the extent to which the cap is threaded onto the bottle depends upon the resistance of the top of the wall 69 to the pinch of the groove 70.

Spaced inwardly from the tongue 67 is the annular tongue or rib 75 which is relatively pointed and forms a tight seal with the end of the bottle as the cap and adapter are seated on it.

Located radially inwardly from the rib 75 is the tongue 76. This tongue is of the same general design as the tongue 50 of Fig. 1 except that its dimensions are smaller. The lower surface tapers downwardly inwardly and the tongue is attached to the adapter by a relatively thin neck. This permits the tongue 76 to flex inwardly, as shown in Fig. 2, when pressure is applied. The inner wall of the tongue 76 is vertical when out of contact with the bottle.

The cap and adapter shown in Fig. 2 are so designed that when the adapter is put in the cap and the cap is held in the position shown in Fig. 3 over the bottle, the adapter will remain in the cap. One way of accomplishing this is for the wall 80 of the cap to taper inwardly ever so slightly and for the outer surface 81 of the adapter to taper at about the same angle or a slightly greater angle. Then when the cap is inverted, and the adapter in inverted position is placed in the cap the adapter will slide downwardly in the cap until it reaches a position at which it is firmly held by the cap and the two can thereafter be held in the position shown in Fig. 3 without danger of the adapter falling out of the cap.

Below the wall 80 the cap widens at 93. This gives sufficient room between the wall and the projection 65 on the mouth of the bottle for the tongue 67 to slide over the projection into the groove 64.

I now describe how the adapter and cap are assembled on the bottle after it has been filled. The adapter is placed in the cap, preferably by inverting both and simply dropping the inverted adapter in the inverted cap. Alternatively, the adapter may be forced into the cap. The adapter is held by the cap so that when the two are thereafter turned upright (as shown in Fig. 3) the adapter will remain in the cap. There are several ways of holding the adapter in the cap, as by providing a bead on the inner wall of the cap or the outer wall of the adapter and a complementary groove on the other surface, or by wedging the adapter in the cap, or by having a portion of the adapter pinched by a suitable arrangement in the caps, etc. Whatever means is used for holding the adapter in the cap, after the bottle has been filled the two are held over the bottle, as shown in Fig. 3. Then the cap is pressed down onto the bottle and screwed onto it, and this causes the tongue 67 of the adapter to widen over the projection 65 on the bottle and to snap into the groove 64. The adapter is thus snapped onto the bottle and will be held on the bottle even when the ultimate consumer unscrews the cap from the bottle to pour the contents from the bottle.

When the cap is lowered onto the bottle with the adapter held in the cap, as illustrated in Fig. 3, the internal threads on the cap engage the external threads 63 on the bottle before the tongue 67 touches the outer end of the bottle. Then as the cap is screwed onto the bottle the tongue 67 is drawn into contact with the bottle and is widened over the projection 65, and eventually is snapped into the groove 64 before the cap is screwed the final distance onto the bottle. The tongue 67 holds the adapter firmly on the end of the bottle and

after it has been firmly seated in the groove 64 it resists turning with the cap. When the tongue 67 fits in the groove 64 it compresses tongue 76 sufficiently to hold it tight to the end of the bottle thereby preventing leakage between the bottle and the adapter when cap 61 is removed from the bottle. When the cap is unscrewed by the ultimate consumer the adapter does not turn and is not lifted from the end of the bottle.

The bottle with the snap-on holding arrangement (groove 64 and projection 65) of less diameter than the threaded neck of the bottle is novel and is claimed herein as my invention.

In the arrangement shown in Fig. 4 the closure cap 84 is of flexible material and may be polyethylene. The adapter 85 is likewise flexible and may be made of polyethylene or the like. The open cap 86 is relatively rigid as is also the bottle 87 which may be made of glass, earthenware, plastic or the like. The cap 86 is screwed onto the bottle when the adapter is positioned on the bottle and is not removed until the adapter is removed. This open cap applies pressure to the flexible flange 88 of the adapter so that there is no leakage from the bottle. The flexible cap 84 makes a tight seal with the adapter so that there is no leakage between it and the adapter.

The outer edge of the flexible flange 88 projects upwardly at 89 and downwardly at 90. The pressure of the shoulder 91 of the cap 86 against the upper rim 89 of the adapter is transmitted to the lower rim 90 and insures close contact between this rim and the outer rim of the top surface of the bottle.

The adapter itself is of the general run-back type illustrated in the preceding drawings. The tongue 92 is similar in construction to the tongue 76 of Figs. 2 and 3. It forms a tight seal with the inner rim of the top of the bottle. In order to unite the tongue 92 to the adapter by the thin neck 93 it is necessary that the tongue 92 be spaced from the lateral flange 88 of the adapter. The inner rim 98 at the bottom of the lateral flange 88 is pointed downwardly and when the adapter is drawn against the bottle by the cap 86 this inner rim forms a tight seal with the top of the bottle. The air pocket 94 between the tongue 92 and the point 98 contains air which is compressed as the adapter is drawn to the bottle. This tends to prevent leakage of any liquid outward around the tongue 92.

The closure cap 84 is of flexible material and ordinarily will be of much the same composition as the adapter. As the cap is threaded onto the bottle, the top of the wall 95 around the run-back channel is pinched in the groove 96. The outer surface 97 of the tongue which projects downwardly from the bottom edge of the dome of the cap 84 slants downwardly inwardly so that the tighter the cap is screwed onto the adapter the tighter the wall 95 is pinched. There is thus no leakage of any liquid between the adapter and the cap 84. The top of the opening 96 is very slightly narrower than the top of the wall 95 so that the latter is never brought into contact with the former because this insures a seal between the wall 95 and both the wall of the cap and the tongue 97.

Figure 5 shows a modification of the adapter shown in Figs. 2 and 3. The tongue 100 which fits into the groove 64 of the bottle is of relatively uniform thickness instead of being bulbous. This facilitates its removal from the mold in which it is formed. The bulbous tongue 67 of the adapter of Figs. 2 and 3 must be squeezed through the narrow annular opening which forms the thin neck by which the bulbous part of the tongue is attached to the adapter. By forming the tongue of substantially uniform thickness, such resistance during removal from the mold is avoided. The adapter of Fig. 5 makes contact with the bottle at its rims. There is no intermediate point of contact as by the rib 75 of the adapter illustrated in Figs. 2 and 3.

In the arrangements illustrated in Figs. 1 and 4, the open cap is threaded on to the bottle and the closure cap is threaded on to the open ring (Fig. 1) and the adapter (Fig. 4). Both threads may turn in the same direction; i. e., they may both be right hand threads or left hand threads. Then when one attempts to screw off the cap, the whole assembly may be screwed off of the bottle. If, however, the threads are different, one being left hand and the other right hand, this is impossible.

The molds in which the adapters are formed are advantageously designed so that the parting lines do not coincide with any sealing surfaces of the adapters. All sealing surfaces are therefore smooth and formed exactly to predetermined dimensions.

Tongues 50, 76, 92 and 97 are shown as being more or less bulbous. When large, it may be difficult to remove a tongue of this shape from the mold. The tongues may be shaped as desired to perform the intended function.

Although various modifications are shown in the accompanying drawings, the invention is not limited thereto as will be evident to the man skilled in the art. The invention is described more particularly in connection with use of the adapter on bottles, although the adapters shown may be used on tin containers, etc. Although particularly designed for use with an adapter provided with a run-back channel, other adapters are included in the appended claims.

This application is a continuation-in-part of my applications Serial Nos. 130,432 filed December 1, 1949, which is Patent 2,601,039, and 172,167 filed July 5, 1950, which is Patent 2,601,040.

What I claim is:

1. In combination with the neck of a container and fastened thereon, an adapter of flexible resilient plastic material with an opening therethrough and the base of which forms continuous seals around the end of the neck in two locations spaced radially from one another with an air pocket between them adjacent the end of the neck, and a closure cap which seals the opening.

2. In combination with the neck of a container and fastened thereon, a spout adapter of flexible resilient plastic material with an opening therethrough and the base of which forms continuous seals around the end of the neck at its inner and outer rims with an air pocket between the seals adjacent the end of the neck, and a closure cap which seals the opening.

3. In combination with a rigid neck of a container, a flexible resilient plastic adapter with an opening therethrough and a flange against the end of the neck, and a rigid cap fastened to the bottle and provided with a surface which covers the outer portion of the flange and presses it to the end of the neck.

4. The combination of claim 3 in which there is an annular air pocket around the bottle between the flange and the end of the bottle, with the flange sealed to the end of the bottle continuously on each side of the air pocket.

5. In combination with a rigid neck of a container, a flexible resilient plastic adapter with an opening therethrough and a bottom portion thereof snapped over the end of the neck and held thereon, and a rigid cap which encloses the adapter and seals the opening and is fastened onto a portion of the neck which is larger in outside diameter than the portion onto which the adapter is snapped, and is below it.

6. The combination of claim 5 in which a portion of the adapter overlies the end of the neck and the cap presses the adapter against the end of the neck.

7. In combination with a rigid neck of a container, a flexible resilient plastic spout adapter with an opening therethrough and having a wall surrounding the opening, and a closure cap which encloses the spout and seals the opening, the top of the wall being squeezed in a groove in the underside of the cap.

8. The combination of claim 7 in which one wall of

395

the groove slants downwardly in contact with the top of the wall of the adapter.

9. In combination, a bottle and flexible resilient plastic adapter, the bottle having external threads on the neck spaced from the end thereof, a portion of smaller outside diameter between the threads and said end, and a groove surrounding the neck between the threads and said portion of smaller diameter, and the adapter having a bead on its inner surface engaged in the groove.

10. The method of assembling a rigid bottle, a rigid closure cap adapted to be fastened to the bottle, and a flexible resilient plastic adapter with an opening therethrough which adapter when inside the cap is adapted to be fastened by pressure to the bottle, which method comprises putting the adapter in the cap, and then fastening the cap to the bottle and thereby exerting pressure on the adapter against the top of the bottle and thereby fastening the adapter to the bottle.

11. In combination a rigid neck of a rigid container, a flexible resilient plastic adapter with an opening therethrough and fastened to the neck, and a rigid closure cap independently fastened to the neck over the adapter and sealing the opening, the outer surface of a wall of the adapter being in contact with the inner surface of a wall of the cap so that were the container not there the adapter would be supported by the cap.

12. In combination, a flexible spout adapter with an opening therethrough and held to the end of a rigid bottle or the like by a rigid open cap through which the spout of the adapter protrudes, the cap having an externally threaded wall rising around the opening, and a rigid closure cap which encloses the top of the spout and seals the opening and is threaded onto said threads on the wall; the adapter being provided around its spout with a cylindrical wall of uniform height which is substantially the same height as said externally threaded wall, upper portions of said walls being in contact with one another, an annular projection protruding downwardly from the closure cap inwardly of said adapter wall having its outer surface slanting inwardly downwardly in contact with the top of the adapter wall and pressing it against the top of the externally threaded wall of the cap.

13. In combination a rigid bottle or the like, a flexible resilient plastic spout adapter with an opening therethrough and a lateral flange touching the end of the bottle in two radially spaced annular locations, and a rigid cap attached to the neck, there being an annular lip projecting downwardly from the under surface of the cap which applies pressure to the top of the flange intermediate said annular locations.

14. A container with a flexible resilient plastic adapter fastened at an opening therein, the adapter having a passage therethrough adapted to serve as a pouring outlet, and a cap which is fastened to the container and the inner surface of which throughout a continuous area around opening makes sealing contact with the adapter.

15. A container with an adapter fastened at an opening therein, the adapter having a passage therethrough adapted to serve as a pouring outlet, a spout at the upper end of the passage, a channel in the adapter around the

passage which includes a higher portion under the spout and a lower portion at the opposite side of the adapter with an opening from said lower portion into the passage so that liquid collecting in the channel from the pouring spout will drain to the opening and thence to the passage, the outer edge of the channel being defined by an annular wall of uniform height which encircles the passage, and a cap which encloses the top of the adapter and is fastened to the container and the inner surface of which makes sealing contact with the top of the wall.

16. A container with a flexible resilient plastic adapter fastened at the opening therein, the adapter having a passage therethrough adapted to serve as a pouring outlet, a spout at the upper end of the passage, a channel outside of the passage which includes a higher portion under the spout and a lower portion at the opposite side of the adapter with a drain for supplying liquid from said lower portion to the interior of the container, the outer edge of the channel being defined by an annular wall which extends to a uniform height above the opening in the container, and a cap which encloses the top of the adapter and is fastened to the container and the inner surface of which makes sealing contact with the top of the wall.

17. In combination with a rigid neck of a container, a flexible resilient plastic adapter with an opening therethrough and a flange against the end of the neck, and a rigid cap fastened to the neck, a continuous and generally annular portion of the cap being in pressure contact with the flange and pressing it into sealing contact with the end of the neck.

18. In combination with the neck of a rigid container and fastened thereon, an adapter of flexible resilient plastic material with an opening therethrough and the base of which is formed with two continuous projections which make continuous seals with the end of the neck in two locations spaced radially from one another with an air pocket between them adjacent the end of the neck.

19. In combination with the rigid neck of a container a flexible resilient plastic adapter with an opening therethrough and a flange against the end of the container, and a rigid cap fastened to the neck and the under surface of which covers the outer portion of the flange and presses it to the end of the neck, the flange thickening at its perimeter so that the edge of the flange extends both above and below the portion of the flange adjacent it, and such thickened edge constituting the outer portion of the flange which is compressed between said under surface of the cap and the end of the neck.

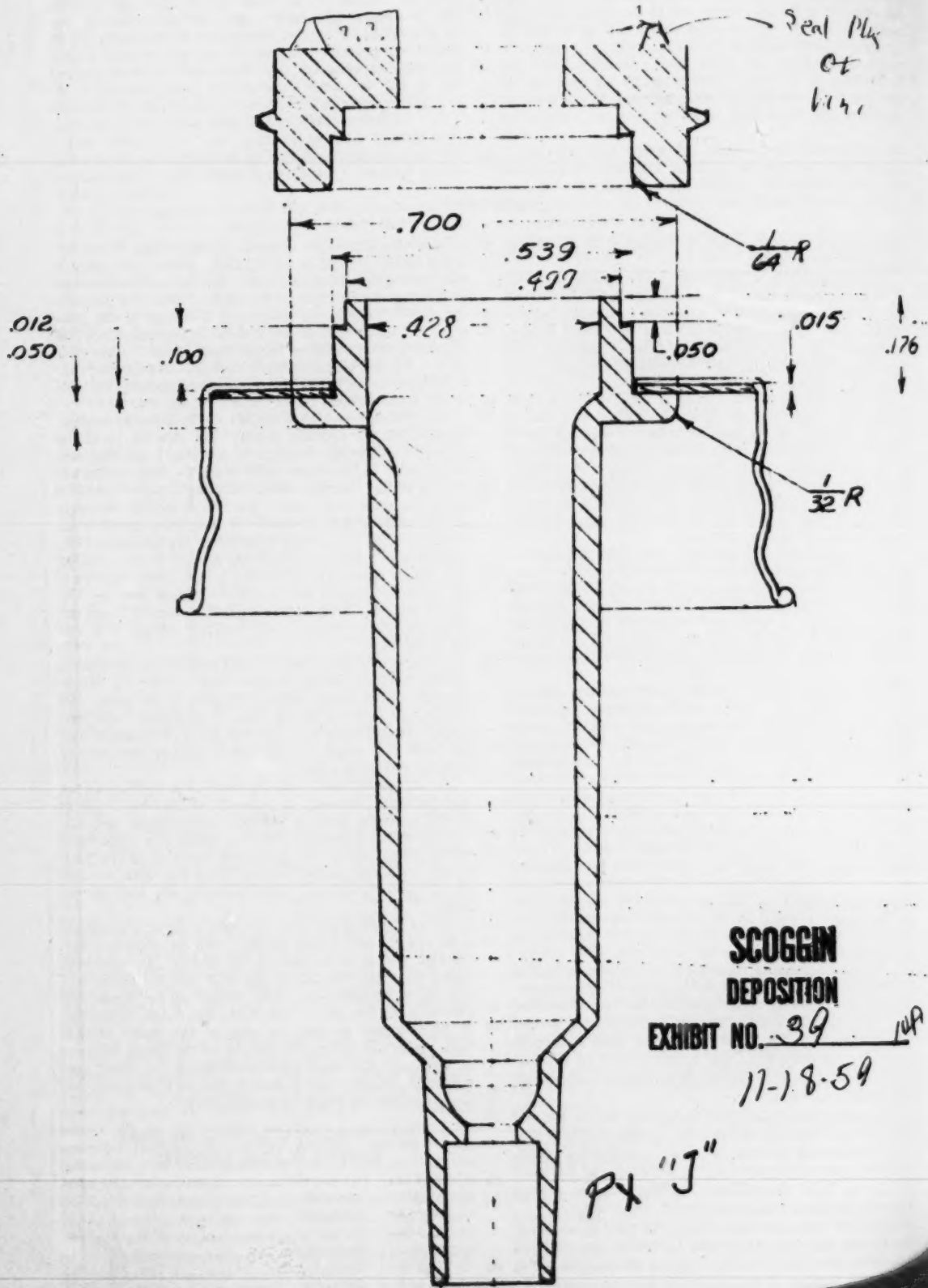
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PLAINTIFF'S EXHIBIT J

396



SCOGGIN
DEPOSITION
EXHIBIT NO. 39
11-18-59

Pl "J"

[1079] PLAINTIFF'S EXHIBIT L.

(Scoggin Deposition. Exhibit No. 40.)

Baxter I. Scoggin
Chester M. Turner
Roland L. Rhodes

February 13, 1957

SUGGESTED CHANGES IN SPRAYER PARTS

A. Barrel (Body).

1. Reduce shoulder diameter from 0.975" to 0.700". (Bottle opening 0.730" to 0.740", Can Opening 0.710").
2. Reduce shoulder thickness from 0.062" to 0.050".
3. Lower position of shoulder on barrel from 0.140" from top of barrel to 0.177" from top.
4. Modify hub according to drawing by Chester M. Turner dated February 11, 1957.
   a. Increase hub diameter to 0.539".
   b. Lesser diameter of hub is 0.499".
   c. Overall height of hub is 0.177".
   d. Height of greater diameter hub is 0.127".
   e. Height of lesser diameter hub is 0.050".
   f. Bevel connecting greater and lesser diameter is 2°.
5. Remove one of vent holes.
6. Re-design one remaining vent hole to reduce possibility of damaging seal.

B. Collar (Ring).

1. Re-design so that collar will fit onto re-designed barrel hub.
2. Consider placing a ridge on top of collar to act as seal between collar and cover cap.

C. Metal Caps, with hole and inner liner.

1. Increase hole diameter from 0.520" + 0.010" to 0.560" + 0.010" if barrel hub diameter is increased.

2. Purchase caps with appropriate inner liner, paper pulp or polyethylene, having a proposed thickness of 0.015".

Note: (This may have to be increased to 0.020" or 0.025". If this happens then "shave off" 0.005" or 0.010" from top of shoulder for required space.)

[1080] 3. Purchase caps with height of 0.404" or less.

Note: "H" Dimension on O-I bottle is 0.385" to 0.405". "H" Dimension on Continental can is 0.500".

D. Polyethylene cover caps.

1. Remove ridge from bottom surface of cap.
2. Knurl lower side of cap.
3. Consider modifying sealing ridge to coincide with ridge on collar.

E. Orifice.

1. Presently trying change in Butterfly of head which may affect orifice.
2. Also considering thinner orifice.

F. Head.

1. Testing one head with butterfly hole partially filled with knob type projection.
2. Consider modifying sealing edge to obtain better seal of head to plunger.

CHESTER M. TURNER

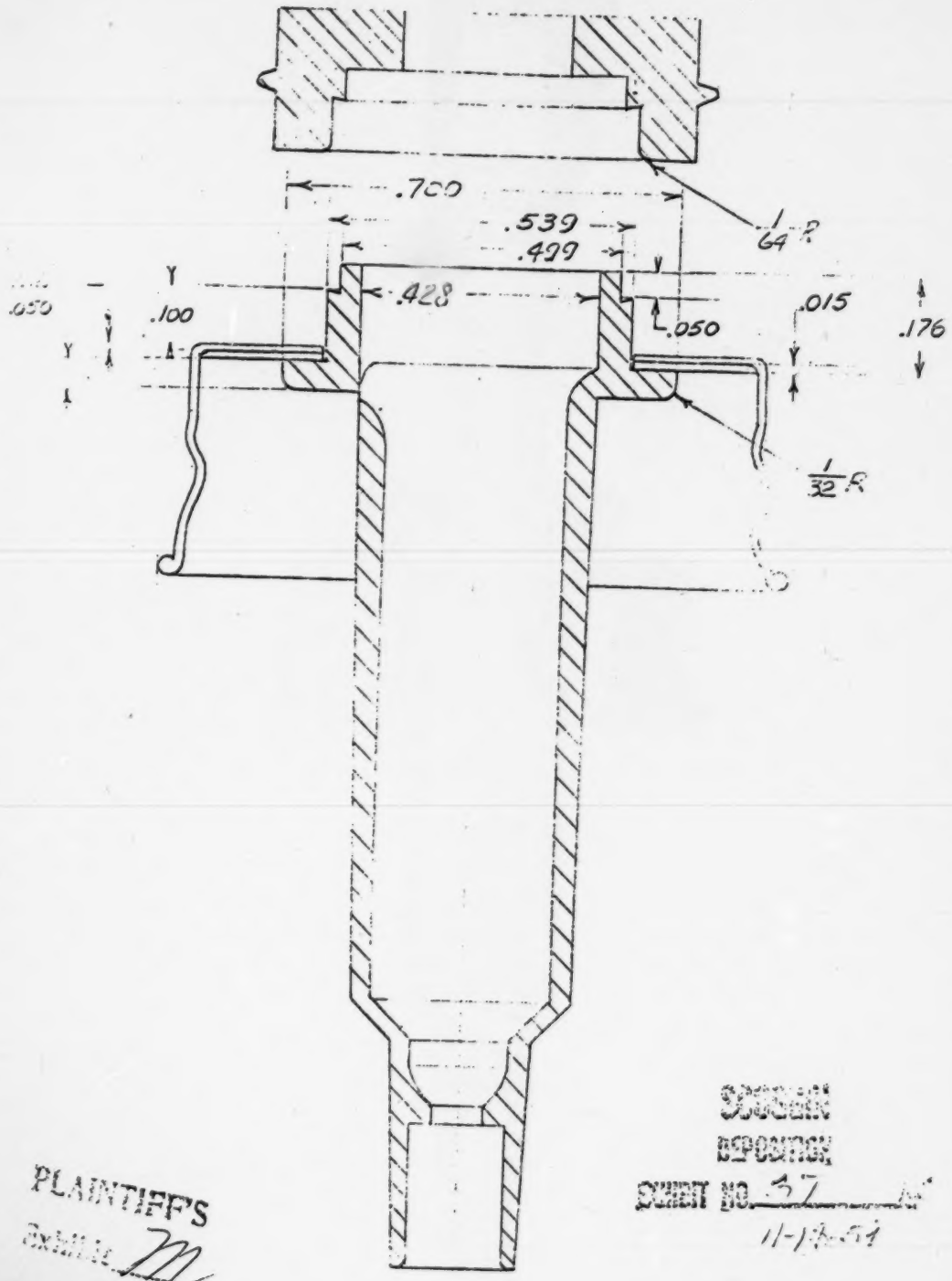
CMT: vk

PLAINTIFF'S EXHIBIT M

399

BY ..... DATE 2-11-57 SUBJECT ..... SHEET NO. ..... OF .....

CHKD. BY ..... DATE ..... JOB NO. .....



PLAINTIFF'S EXHIBIT M

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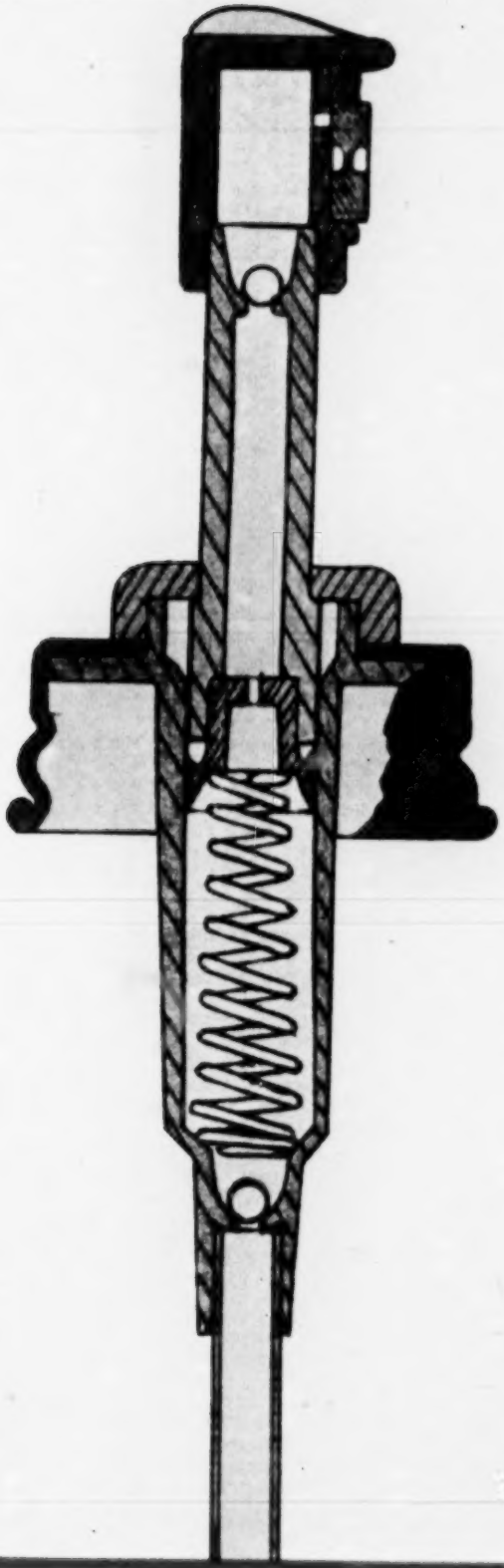
DEPOSITION EXHIBIT NO. 37

11-13-57

PLAINTIFF'S EXHIBIT P

BAKAN 1 SPRAYER

401

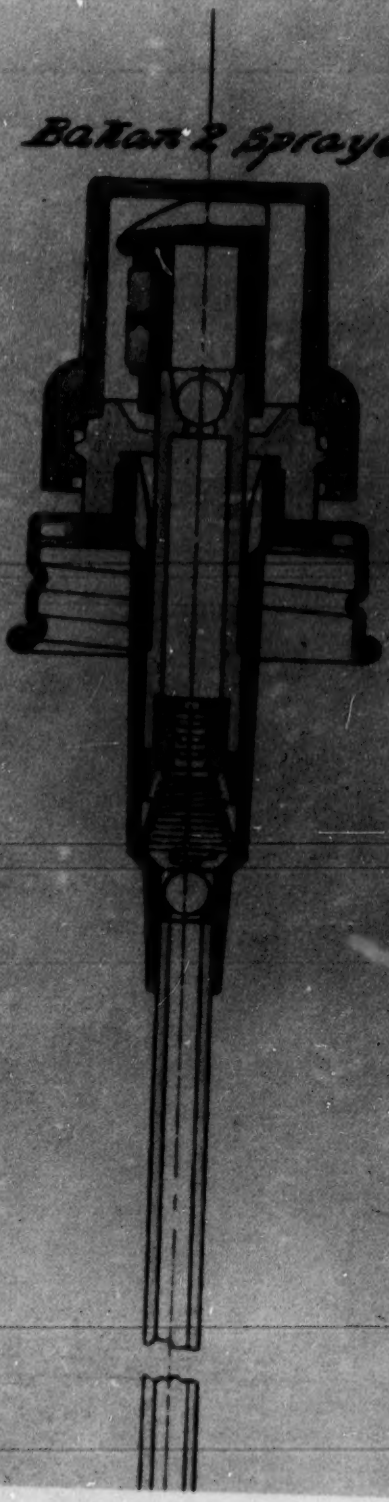


PLAINTIFF'S EXHIBIT Q
403

PLAINTIFF'S
Exhibit Q

Ba 3/7

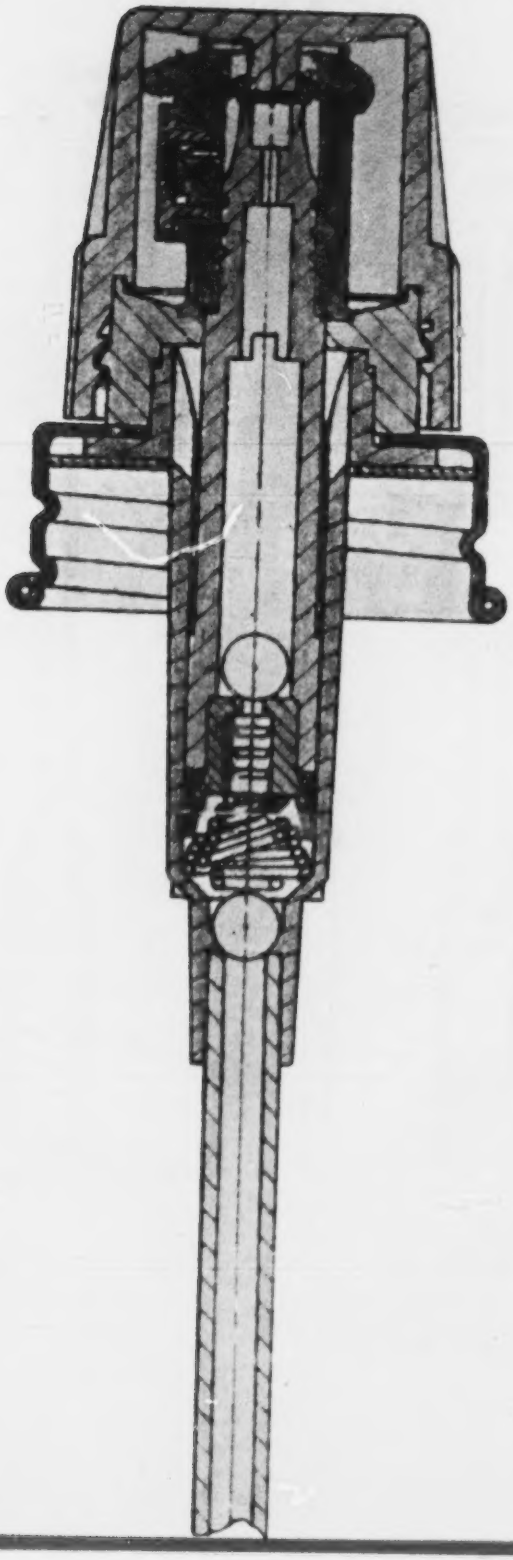
Baker 2 Sprayer - As First Made



PLAINTIFF'S EXHIBIT S

BAKAN 3 SPRAYER

405



PLAINTIFF'S EXHIBIT T

407

June 7, 1938. F. W. LOHSE 2,119,884

LIQUID SPRAYER

Filed June 22, 1936

Fig. 1.

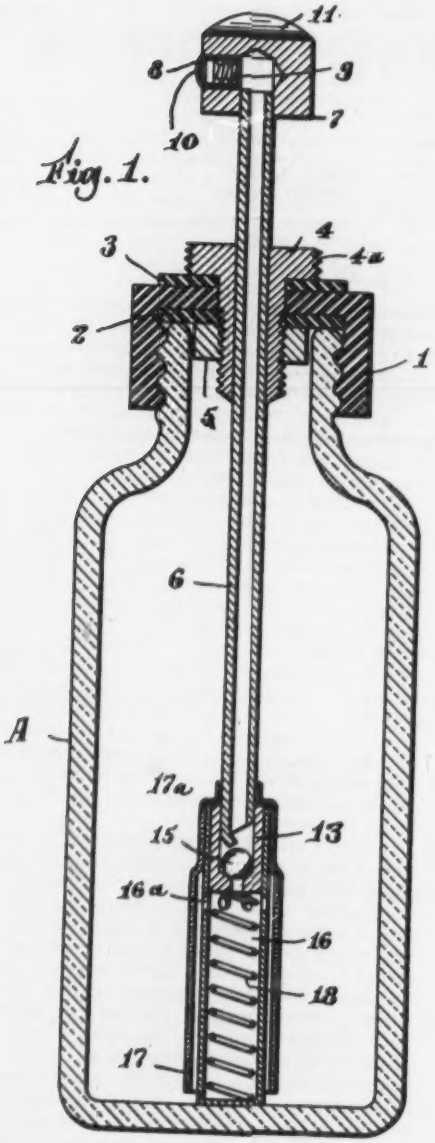


Fig. 2.

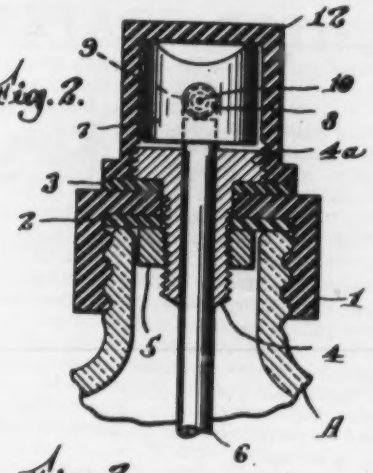
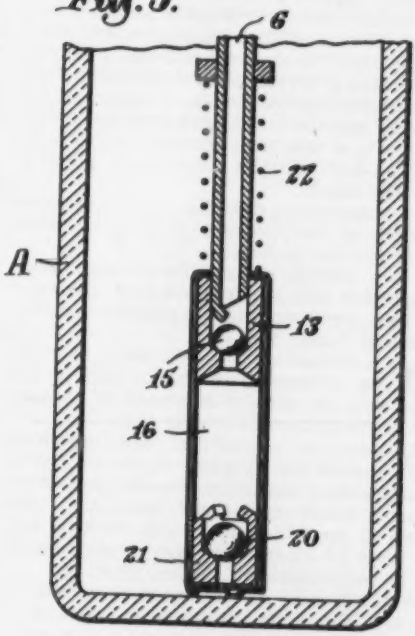


Fig. 3.



Inventor
F. W. Lohse
by
Geo. N. Goldsborough Attorney

Patented June 7, 1938 2,119,884

408

UNITED STATES PATENT OFFICE

2,119,884

LIQUID SPRAYER

Frederick W. Lohse, Attleboro, Mass., assignor to T. J. Holmes Company, Inc., Norton, Mass., a corporation of Massachusetts

Application June 22, 1936, Serial No. 86,461

1 Claim. (Cl. 221—85)

This invention relates to liquid sprayers of the general type used for spraying liquids upon windows, house plants, clothing and for other purposes and is intended to provide simple and effective means for economically performing its functions while also making provision for convenient and safe transportation when filled, or partly filled, with liquid without danger of leakage of the contents.

With these objects in view the invention comprises a bottle closure removably attachable to a bottle or other container and provided with a movable plunger piston and a liquid chamber, the closure being provided with removable sealing means which serves both to prevent leakage of the liquid content to the outside and to retain the plunger in a depressed position to avoid the filling of the outlet conduit which forms a hollow stem for the piston.

In the accompanying drawing I have illustrated embodiments of the invention to different forms of sprayer devices, in which—

Fig. 1 is a vertical section illustrating a container provided with my improvement, the sealing cap being removed and the plunger standing in its normal raised position.

Fig. 2 is a central section on a plane at right angles to Fig. 1 showing the upper part of the container with the plunger depressed by engagement with the leak-proof sealing cap.

Fig. 3 illustrates a modified form of piston chamber construction in which the coiled spring is placed outside of the piston chamber and above it, instead of inside and beneath the piston. The diameters of the piston stem and its bore are, for the sake of clear illustration, much exaggerated in comparison with actual practice.

In the practice of my invention according to the illustration in the drawing, A indicates a bottle or similar container having an externally threaded neck portion for the reception of an internally threaded closure or cap 1, which is provided with interior washer 2 and an exterior washer 3 around a central opening through which is inserted a central headed thread 4, whose head is externally threaded and whose inwardly projecting shank portion is threaded to receive a clamping nut 5.

The threaded plug 4 is provided with a smooth cylindrical axial bore and in this bore or passage is slidingly mounted a close fitting hollow plunger stem 6. To the top of the plunger stem 6 is secured a spraying block having, in this case, a transversely bored passage for the reception of a hollow nozzle member 8, in which is inserted an externally threaded plug to assist the spraying of the liquid but restricting its escape and giving it a whirling motion before it passes out through the very small nozzle opening 10. The sprayer block 7 is also provided with a diametrical groove or recess extending in the vertical plane of the spray nozzle, so that when the finger is pressed into this groove the spray points in the direction of the finger.

To render the sprayer safe for transportation in a trunk or container with other articles, which would be injured by leakage of the liquid, I provide a cup-shaped sealing cap 12 dimensioned to cover and overlap the sprayer head 7, the bottom or open end of the cap being internally threaded to screw upon the threads 4a of the central member 4 of the closure cap. While a few drops of liquid may leak out of the nozzle under certain conditions, nevertheless it can not escape to the outside because the sealing cap, when screwed down tightly against the washer 3, forms a positive and reliable seal wholly preventing any possible escape of the liquid, either through the nozzle or through the joint between the central plug 4 and the closure.

A cylindrical piston 13 is secured to the lower end of the plunger stem 6 and, as shown, is provided with an internal valve chamber in which is mounted a check valve 15 in the form of a ball closing the central passage in the lower end of the piston when the piston moves to the top of the surrounding piston chamber 16 after the liquid has been expelled by the downward stroke. The object of the valve is to prevent weakening the partial vacuum in the piston chamber 16 created by the upward stroke of the pump and means is provided to prevent the check valve member 15 from closing the liquid outlet passage formed through the stem 6 in any suitable manner, as by means of an in-turned lip 14 at the lower end of the piston stem.

It will be observed that the piston or pump chamber is closed at the bottom and is surrounded by an elongated shell annularly spaced from the outside of the piston chamber. The piston chamber is also provided with inlet holes 16a immediately below the level of the bottom of the piston when the piston is in raised position. A helical spring 18 is seated upon the closed bottom of the pump chamber and exerts an upward pressure or thrust against the bottom of the piston. The outer shell 17 has its upper portion contracted to fit snugly around the open or upper end of the piston chamber 16 and has its upper portion in-turned to form an annular

flange 17ª, which closely fits around the piston stem and serves as a stop for the upward stroke of the piston.

When the piston is depressed by pressure of the fingers upon the spray block 7 after its bottom has passed below the level of the liquid inlet opening 16ª, the only escape for the liquid is through the hollow piston stem to the sprayer head, as it will be seen that the piston itself acts as a valve preventing the escape of liquid through the passages 16ª during the remainder of the down stroke after it has passed below said passages. Upon the release of pressure on the spray head the piston is rapidly returned to its uppermost position creating a partial vacuum, so that the liquid in the bottle, so long as the lower end of the outer shell or skirt 17 is submerged, rushes up through the inlet passage formed between the outer shell 17 and the pump chamber and fills the chamber. The piston itself acts as a trap on substantially its whole downward stroke to expel the liquid through the tube 6 and on the upstroke, as soon as it uncovers the opening 16ª forming part of the liquid inlet passage, creates a suction for the purpose of supplying the piston chamber with more liquid.

In Fig. 3 is shown a pump chamber in which the piston 13 does not act as a valve and a check valve 20 is provided at the bottom inlet passage resting upon a centrally bored seat member 21, the bottom of the piston chamber being provided with a valve-controlled inlet opening. The object of extending the exterior skirt or shell 17 down almost to the bottom of the pump chamber, to which it is secured, is to permit the removal of liquid until the bottle is practically emptied.

While the return spring is shown in Fig. 1 as inserted in the piston chamber itself, in the form shown in Fig. 3 I have shown the return spring 22 surrounding the piston stem and interposed between the top of the piston chamber and a stop member 23 secured to the piston stem 8 at a suitable distance above the piston 13 to permit the piston to have its full stroke downward and upward.

The closure parts are shown in the drawing as composed of rubber or bakelite, so that the device may be used for liquids which are likely to attack metal, but obviously they may be made of any suitable material.

What I claim is:

In a spraying device for liquids, a bottle having a threaded neck, a reciprocating pump mounted within the bottle, a hollow pump rod connected to the pump for reciprocation thereof and extending outwardly through the bottle neck, a cap for the bottle having a flat upper face and a threaded bore in which the bottle neck is received, an enlarged washer applied to the upper face of the cap, a washer applied to the bottom of the cap bore and engaging the end of the bottle neck, a hollow plug for supporting the pump rod, said plug having an enlarged externally threaded head of less diameter than the washers seated against the upper washer, and a threaded stem extending axially downwardly through the washers and cap, a nut on the threaded stem bearing against the inner washer and cooperating with the plug head to hold the washers and cap rigidly together, a sprayer block including a nozzle on the upper end of the pump rod and an inverted thimble-like sealing cap telescoped over the sprayer block and threaded on the plug head to bear against the upper washer.

FREDERICK W. LOHSE.

PLAINTIFF'S EXHIBIT U

410

Feb. 19, 1952 R. MELLON 2,586,687

CLOSURE CAP FOR LIQUID SPRAY CONTAINERS

Filed May 27, 1950



FIG. 1.

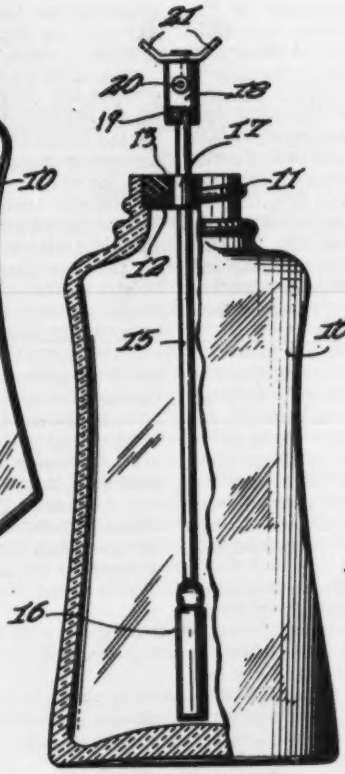


FIG. 2.

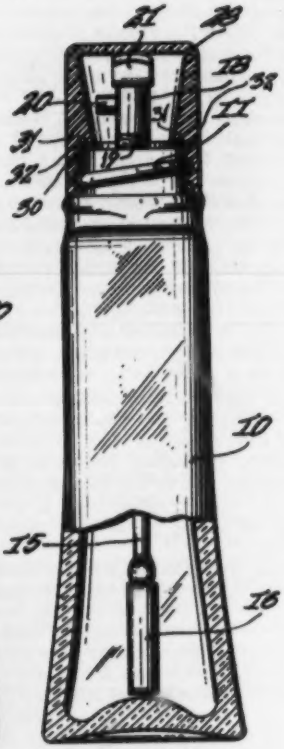


FIG. 3.

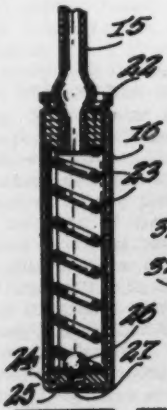


FIG. 7.



FIG. 4.

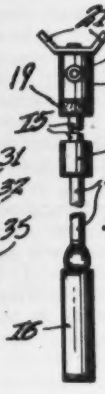


FIG. 6.



FIG. 5.

INVENTOR.
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Patented Feb. 19, 1952

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2,586,687

UNITED STATES PATENT OFFICE

2,586,687

CLOSURE CAP FOR LIQUID SPRAY CONTAINERS

Russell Mellen, Sloatsburg, N. Y.

Application May 27, 1950, Serial No. 164,307

4 Claims. (Cl. 239—97)

1

This invention relates to new and useful improvements in pumps utilized for spraying liquids of various kinds from a bottle or the like.

More particularly, the present invention proposes certain improvements in spray pumps of the type commonly used to spray a liquid window cleaner on window panes, car windshields and other glass surfaces; to spray liquid insecticides, moth proofing liquids, deodorizers and liquid preparations to remove ice and sleet from automobile windshields; or for any other liquids of a similar type which are to be discharged in a fine spray or mist.

Heretofore, the spray or pump unit had to be purchased separately from the bottle which contained the liquid that had to be sprayed making it necessary to mount the spray or pump unit on the bottle and remove it therefrom each time that the liquid preparation was to be used. This resulted in a time consuming inconvenience accompanied by evaporation of the liquid preparation and, oft times, resulted in spilling of the bottle contents when carelessly handled during mounting and removing of the spray unit.

The known pump utilized for such spraying includes a valve immersed in the liquid in a bottle, said valve being closed in the normal position of the pump operating means and maintaining a quantity of liquid between itself and the spout means of the pump. This, it has been found, results in that said quantity of liquid rapidly evaporates and causes a financial loss to the user.

Another object of the invention therefore is the provision of removable cap means which not only seals the pump entirely within the bottle, but also encloses the pump so that no liquid is maintained between the said valve and the pump spout means.

For further comprehension of the invention, and of the objects and advantages thereof, reference will be had to the following description and accompanying drawings, and to the appended claims in which the various novel features of the invention are more particularly set forth.

In the accompanying drawings forming a material part of this disclosure:

Fig. 1 is a perspective view of a bottle in and on which the means of the invention are embodied.

Fig. 2 is a front view of the bottle with the cap means removed and with a portion thereof sectioned away.

Fig. 3 is an end view of Fig. 2, but with the

2

cap mounted in position on the top of the bottle and shown in vertical section.

Fig. 4 is an enlarged partial vertical sectional view of the cap per se.

Fig. 5 is a sectional view of the top portion of the bottle before the pump is mounted therein.

Fig. 6 is a view of the pump to be mounted in the bottle with the mid portion thereof broken away.

Fig. 7 is a sectional view of the bottom portion of the pump.

According to the invention a bottle 10 containing any liquid to be sprayed is provided with an externally threaded neck 11 and is sealed by a rubber plug 12 as shown in Figs. 1 and 5. The plug 12 has its top face flush with the top of the bottle 10 and is provided with a hole 13 in its center which, until the liquid in the bottle is to be utilized, is sealed by a puncturable membranous sheet 14.

The pump to be associated with this bottle for the purpose of spraying the liquid on a window pane or the like is illustrated in Figs. 2, 3, 6, and 7. The pump comprises a long tube 15 having its lower end slidably fixed in a cylinder 16 and having slidably mounted thereon a sleeve 17. According to the invention, the sleeve 17 is of slightly greater diameter than the cylinder 16 so that on puncturing the membrane 14 said cylinder can readily be passed through the hole 13 in plug 12. The wider sleeve 17 must be forced into said hole however and the effect is that the sleeve becomes fixed in the hole and the tube 15 is slidable up and down therein.

At its upper end tube 15 opens into a small housing 18 having a spout 20 through which liquid forced up through the tube 15 can be ejected. At the top of housing 18 there is provided a saddle-like finger piece 21 by which the tube 15 can be pressed downward into the cylinder 16.

A sponge rubber gasket 19 is secured around the tube 15 directly below the housing 18 to insure dependable closure when the cap is closed.

Within the cylinder 16 the end of the tube 15 has secured thereon a piston 22 which normally is held in the upper part of the cylinder by a coil spring 23 which bears on a washer 24 forming the base of the cylinder. Washer 24 is provided with a hole 25 which forms with a ball 26 seated therein a valve for the pump. In order to permit liquid entering the cylinder through the hole 25, the wall of said cylinder is continued downward beyond the washer 24 and is provided with a plurality of notches 27.

Normally the cylinder 16 is filled with the liquid contents of the bottle 10 so that if the tube 15 be depressed by finger piece 21, the piston 22 will force the liquid up through the tube and out of the spout 26. During this operation the ball is seated in the hole 25 and the liquid is not forced back into the bottle through said hole. The spring 23 is then allowed to restore piston 22 to the upper end of the cylinder 16, the liquid pressure forcing the ball 26 out of its seat during such restoration, and refilling the cylinder.

It will be seen that there is no seal between the liquid in the cylinder 16 and the opening in spout 26 so that when the bottle is laid aside the said liquid will evaporate. To prevent this the following means are provided:

Referring to Figs. 3 and 4, a cap 28 preferably of plastic is provided with internal threads 30 to screw onto the threaded neck 11 of bottle 10. Above the threads 30 the internal diameter of the cap is lessened to provide an annular shoulder 31 against which is located a ring-like gasket 32 of paper or similar material. As shown in Fig. 4, the gasket 32 bears against the rubber plug 12 in the neck of the bottle when the cap is drawn up on the bottle neck. Thus the pump is sealed within the cap. As a further precaution against evaporation the vertical, inner dimension of the cap is such that when the same is drawn up on the bottle neck it holds the tube 15 in depressed position so that the piston 22 is located in the bottom of the cylinder and prevents any liquid from entering the cylinder 16.

The construction is such that if the tube 15 is depressed slowly the liquid in the cylinder will not be forced up into the tube but will leak back into the bottle. Thus, the tube can be depressed slowly by the cap 28 and no liquid will spray from spout 26; and once the cap is secured in place, evaporation of the liquid in the bottle will be prevented.

From Fig. 4, it will be noted that the bottom portion of the outer periphery of the cap 28 is provided with a circular band of serrations 35 providing a grip for tightening the cap 28 onto the threaded neck 11 of the bottle and for loosening the cap when it is to be removed.

It will be seen, therefore, that once purchased the pump and cap of the invention can be utilized with a succession of the bottles of the invention, with the result that the amount of money expended for window cleaning is substantially reduced.

It is to be understood that the cap 28 may be of a flat or round top surface or of any other desired shape.

While I have illustrated and described the preferred embodiment of my invention, it is to be understood that I do not limit myself to the precise construction herein disclosed, and the right is reserved to all changes and modifications coming within the scope of the invention as defined in the appended claims.

Having thus described my invention, what I claim as new, and desire to secure by United States Letters Patent is:

1. Closure means for a bottle having an externally threaded neck closed by an apertured plug through which the tube of a pump is slidably extended and a discharge housing on the top end of the tube, said closure means comprising a hollow cap fitted over the top of the discharge housing and having internal threads engaging the external threads of the neck, said cap having a top wall spaced from the plug a distance less than the normal distance between the plug and the top of the housing so that said cap holds the tube and housing in a lowered position in which the bottom end of the housing is spaced slightly from the top of the plug, means within said cap holding the plug against accidental discharge from the neck, and means on the tube in the space between the plug and the housing sealing the passage of the tube through the plug.

2. Closure means for a bottle having an externally threaded neck closed by an apertured plug through which the tube of a pump is slidably extended and a discharge housing on the top end of the tube, said closure means comprising a hollow cap fitted over the top of the discharge housing and having internal threads engaging the external threads of the neck, said cap having a top wall spaced from the plug a distance less than the normal distance between the plug and the top of the housing so that said cap holds the tube and housing in a lowered position in which the bottom end of the housing is spaced slightly from the top of the plug, means within said cap holding the plug against accidental discharge from the neck, and means on the tube in the space between the plug and the housing sealing the passage of the tube through the plug, said plug holding means comprising an annular shoulder within said cap, said shoulder being spaced slightly above the top face of the plug, and a ring-like gasket within said cap between the shoulder and the plug.

3. Closure means for a bottle having an externally threaded neck closed by an apertured plug through which the tube of a pump is slidably extended and a discharge housing on the top end of the tube, said closure means comprising a hollow cap fitted over the top of the discharge housing and having internal threads engaging the external threads of the neck, said cap having a top wall spaced from the plug a distance less than the normal distance between the plug and the top of the housing so that said cap holds the tube and housing in a lowered position in which the bottom end of the housing is spaced slightly from the top of the plug, means within said cap holding the plug against accidental discharge from the neck, and means on the tube in the space between the plug and the housing sealing the passage of the tube through the plug, said sealing means comprising a gasket on the tube in the space between the top of the plug and the bottom of the housing.

4. Closure means for a bottle having an externally threaded neck closed by an apertured plug through which the tube of a pump is slidably extended and a discharge housing on the top end of the tube, said closure means comprising a hollow cap fitted over the top of the discharge housing and having internal threads engaging the external threads of the neck, said cap having a top wall spaced from the plug a distance less than the normal distance between the plug and the top of the housing so that said cap holds the tube and housing in a lowered position in which the bottom end of the housing is spaced slightly from the top of the plug, an annular shoulder within said cap, said shoulder facing and being spaced slightly above the top face of the plug, a ring-like gasket within said cap between said shoulder and the plug holding the plug in position in the neck, and a tubular gasket of soft rubber material on the tube in the space between the top of the plug and the bottom of

413

the housing sealing the passage of the tube through the plug.

RUSSELL MELLON.

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2,119,884	Lohse	June 7, 1938

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Number	Country	Date
441,014	France	May 17, 1912

PLAINTIFF'S EXHIBIT V

4/4

Nov. 25, 1958 R. MELLON 2,861,839

COMBINATION CONTAINER, CAP AND SPRAYER

Filed Jan. 14, 1957 2 Sheets-Sheet 1

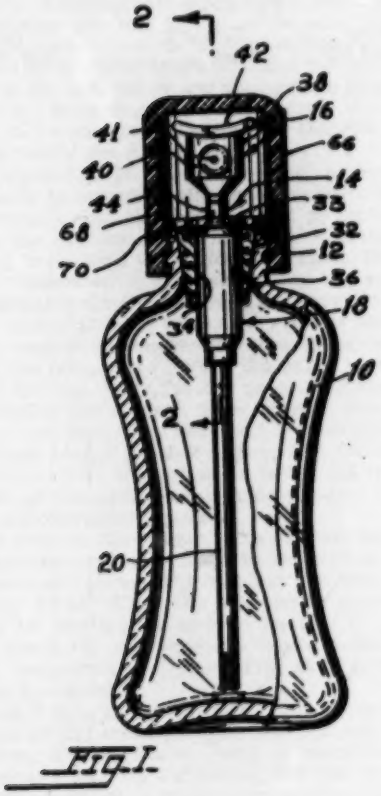


FIG. 1.

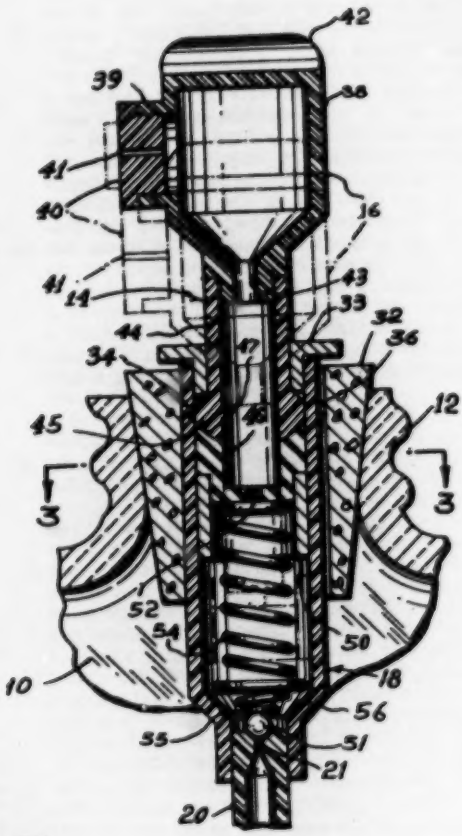


FIG. 2.

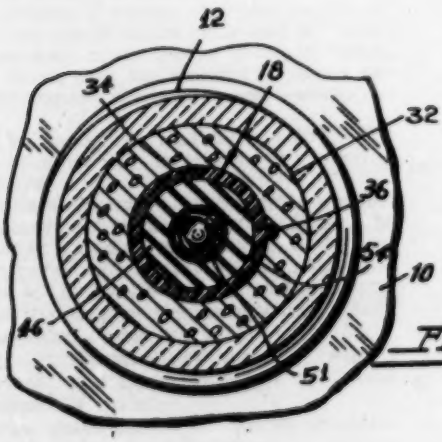


FIG. 3.

INVENTOR.
RUSSELL MELLON
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ATTORNEY

415

Nov. 25, 1958 R. MELLON 2,861,839

COMBINATION CONTAINER, CAP AND SPRAYER

Filed Jan. 14, 1957

2 Sheets-Sheet 2

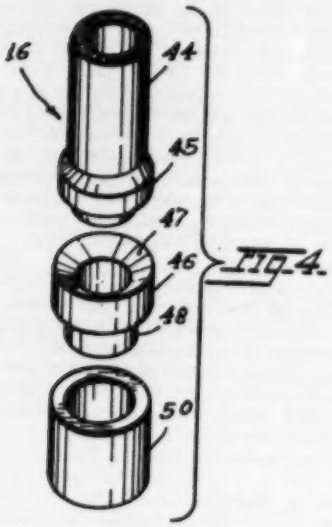


Fig. 4.

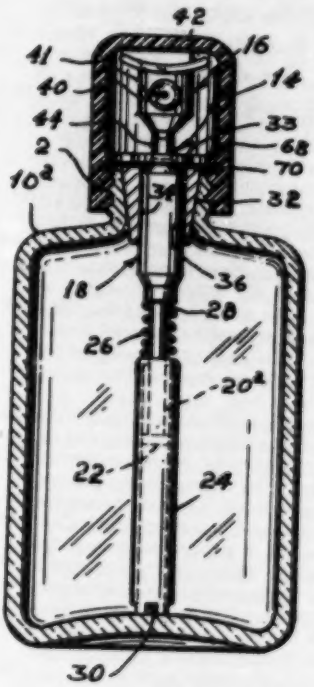


Fig. 5.

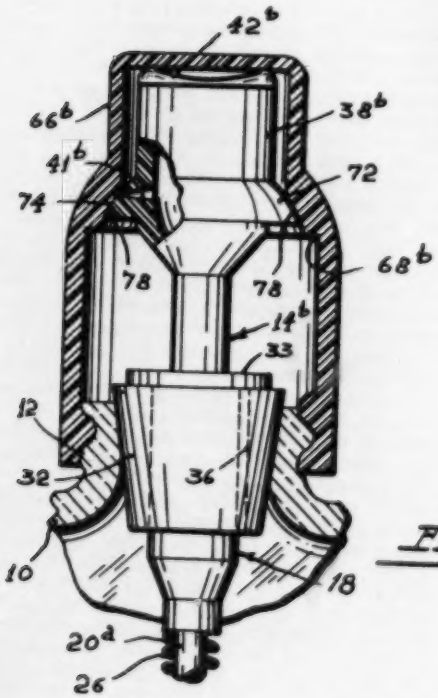


Fig. 6.

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United States Patent Office 2,861,839 Patented Nov. 25, 1958

2,861,839

COMBINATION CONTAINER, CAP AND SPRAYER

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Application January 14, 1957, Serial No. 634,827

1 Claim. (Cl. 299—97)

This invention relates to a combination container of the bottle type, a removable closure cap therefor, and a spray device normally enclosed by said closure cap. The present invention represents an improvement over the device shown in U. S. Patent No. 2,586,687, issued to me on February 19, 1952. The main object of the present invention is to provide a generally improved device of the character described, so designed as to be applicable to bottles or similar containers of various sizes, or of various neck diameters.

A more specific object is to provide a combination device as stated which will be characterized by the disposition of the pump unit thereof directly within the stopper of the container, as distinguished from previous devices wherein the pump unit is located in the body portion of the bottle. By reason of the present arrangement, different stoppers may be selected, to be fitted onto a single pump unit, so that the pump unit and stopper assembly can be readily mounted in bottle necks of different diameters. In this way, the combination device constituting the present invention can be kept indefinitely, and positioned in any bottle that is conveniently accessible for the purpose of holding the liquid to be sprayed.

A further object is to provide a generally improved pump unit capable of assembly at low cost, while being fully efficient in the discharge of its intended functions.

Another object of importance is to provide a closure cap for the spray device so designed that the cap will fully seal the bottle against leakage or evaporation of the liquid, while simultaneously retaining the plunger of the spray unit in a depressed, fully inoperative position of adjustment.

A more specific object, in a modified form of the invention, is to include a stem or conduit depending from the pump unit within the container which is adapted under all circumstances to extend axially within the container fully to the bottom thereof, even though the bottle may be of a length greater or less than a bottle in which the unit was previously disposed. It is proposed, in this regard, that the conduit be self-adjusting in length, with its inlet end located in every instance at the bottom of the bottle, to insure the passage of liquid thereinto even though the bottle may be almost fully exhausted of its contents.

In another modified form of the invention, it is an important object, further, to eliminate the necessity for sealing gaskets or the like on the closure cap, by designing the cap in a manner such that when threaded onto the neck of a conventional bottle, a shoulder within the cap will sealably engage the nozzle of the device, to seal the pump unit against evaporation of liquid therethrough, with the cap at the same time depressing and rendering wholly inoperative the operating plunger of the spring unit.

For further comprehension of the invention, and of the objects and advantages thereof, reference will be had to the following description and accompanying drawings, and to the appended claim in which the various novel features of the invention are more particularly set forth.

In the accompanying drawings forming a material part of this disclosure:

Fig. 1 is a longitudinal sectional view through the container, closure cap, and spray device in which parts remain in elevation, the closure cap being in its sealing position.

Fig. 2 is an enlarged longitudinal section substantially on line 2—2 of Fig. 1, the plunger and piston unit being shown in dotted and full lines in depressed and extended positions, respectively, the closure cap being removed.

Fig. 3 is a transverse section on the same scale as Fig. 2, substantially on line 3—3 of Fig. 2.

Fig. 4 is an exploded perspective view of a portion of the plunger assembly.

Fig. 5 is a longitudinal sectional view showing the spray device mounted in a bottle of a size different from that shown in Fig. 1, the pump and conduit assembly remaining in elevation, the stem being of a modified construction.

Fig. 6 is an enlarged longitudinal sectional view through the upper portion of another modified construction, in which portions remain in elevation and portions are shown broken away.

Referring to the drawings in detail, in Fig. 1 there has been shown a bottle 10 which may contain various liquids to be sprayed, such as window cleaners, insecticides, etc. The bottle has a neck 12 externally threaded to receive the closure cap of the invention.

The spray device, generally designated 14, includes a plunger or piston generally designated 16 axially shiftable in a hollow cylinder 18 having a reduced lower end receiving and fixedly secured to a tubular stem 20 extending within the bottle. The stem is closed at the top but is provided with a restricted passage 21 communicating with the interior of cylinder 18. The end of the stem is dished around passage 21.

In Fig. 5, the spray unit 14 is identical to the first form of the invention, but the stem construction is modified, and automatically extends or retracts according to the size of the bottle. Thus a bottle 10^a, smaller than bottle 10, is shown. In the modified form, a compression coil spring 26 is circumposed about a stem 20^a. This bears at its lower end against the upper end flange of a tubular extension 24. At its upper end, spring 26 abuts against the lower end 28 of cylinder 18. Extension 24 is thus continuously biased in a direction to extend the same to its maximum extent beyond stem 20^a, into engagement with the bottom of container 10^a. The lower end of extension 24 is formed open, and has inlet ports 30 angularly spaced uniformly about its circumference.

It becomes apparent, therefore, that the device when formed as in Fig. 5 may be inserted in bottles of different lengths and efficiently used in each instance. In a long bottle such as shown in Fig. 1, spring 26 causes extension 24 to project beyond stem 20 a substantial distance, so that the conduit defined by the stem and extension will adjust itself to the overall length of the bottle with the inlet ports still being disposed directly at the bottom of the bottle, to insure the inflow of liquid into the device even though the contents of the bottle have been almost fully exhausted. If the device were mounted in a short container such as shown at 10^a in Fig. 5, the extension 24 would be shifted in the direction of the cylinder 18 against the restraint of spring 26 to telescope the stem 20 within extension 24 to a substantially greater extent, thus reducing the overall length of the conduit extending from the bottom of the bottle to cylinder 18.

The self-adjusting conduit, while being held against the bottom of the bottle despite the fact that the bottle may be shorter or longer than one previously used, has

the desirable feature of remaining at all times in a position extending axially of the bottle, with the ports fully open. This is distinguished from an arrangement, for example, in which a flexible hose might be inserted into the bottle, coiling irregularly therein in an arrangement in which the inlet end of the hose might tend to be forced away from the bottom of the container or might become wholly or partially closed by movement into a position directly against the bottom or side wall of the container.

Referring now to Fig. 2, a stopper 32 of cork or other resilient, sealing material has an axial bore 34 in which the cylinder 18 is snugly but removably engaged. Thus, the stopper can be slipped off the cylinder, to be replaced by a different stopper of a diameter and/or exterior shape different from that shown in the drawing, for the purpose of fitting the device into bottle necks of different diameters.

In any event, the stopper used is tightly fitted upon the cylinder, and has a longitudinal passage 36 extending from end to end of the stopper and open at both its ends, said passage being in communication with bore 34 and defining an air vent when the spray unit is being used, to maintain atmospheric pressure on the surface of the bottle contents, thereby to assure a proper pumping action. Cylinder 18 has a collar 33 rigidly connected to it and sealing the passage at other times, responsive to a slight adjustment of the cylinder downwardly in stopper 32.

The plunger 16 includes a hollow, enlarged head 38 having a laterally opening annulus 39 in which is fixedly engaged a nozzle 40 formed with a restricted outlet 41. Integrally formed on the upper end of the head is an arcuately depressed thumb rest 42, the ends of which project laterally outwardly from the head in opposite directions.

At its lower end, head 38 has a reduced portion or neck 43 fixedly engaged in the outer end of a plunger tube 44 formed at its lower or inner end with an enlargement 45 having a rounded bottom surface seating in and adhesively or otherwise fixedly engaged in a complementary depression 47 of a rubber insert 46 having a leak-proof wiping contact with the wall of cylinder 18. Insert 46 has a reduced axial extension 48 fixedly engaged in a tubular member 50 in cylinder 18. Extension 48 has an end wall formed with an opening 52.

Extending into member 50 and bearing against the perforated end wall of insert 46 is a compression coil spring 54, the other end of which has a large convolution seating on a frusto-conical shoulder 56 provided at the lower end of cylinder 18. The spring is formed with a light convolution 55 below the large convolution, at its extreme end pressing lightly against a ball check valve 51 seated in the dished portion on the upper end surface of the stem 20. The spring normally biases the plunger 16 to its extended, full line position of Fig. 2.

When the container and spring device are not in use during the actual spraying of liquid, a plastic closure cap 66 of inverted cup shape is applied to neck 12. Cap 66 is internally threaded at its lower open end, to receive the threaded neck of the bottle, and within the cap, adjacent the threads thereof, there is formed an inwardly directed, circumferential shoulder 68 to the underside of which is cemented an annular, compressible, sealing gasket 70.

The cap is so proportioned that when applied over the rest 42 in the manner shown in Fig. 1, and threaded onto neck 12, it will fully depress the plunger to its dotted line position of Fig. 2. When the plunger rest is fully depressed to tightly engage the upper end of the head, the sealing gasket 70 will at the same time be fully compressed against the neck 12 to insure positively against any leakage of liquid that might otherwise tend to develop. Evaporation of liquid is also insured against, should such evaporation tend to occur through nozzle 40.

In use of the device, cap 66 is removed. Spring 54 is now free to expand, and raises the plunger to its full line position of Fig. 2, with the user holding the bottle in his hand while maintaining pressure on rest 42 with the thumb of the hand. The cylinder 18 is manually pulled upwardly a short distance through stopper 32 to unseat collar 33.

Then, the liquid is sprayed merely by alternately depressing the rest 42 and then permitting it to move outwardly under the pressure of the spring 54. Each depression of the rest moves the plunger or piston through its pressure stroke to the dotted position shown in Fig. 2, so that the piston reduces the size of the chamber defined between the lower end of insert 46 and the stem.

When pressure on rest 42 is released and spring 54 is permitted to expand, raising the piston, the piston moves through its suction stroke to its full line position of Fig. 2. This develops suction in cylinder 18 lifting ball valve 51 off its seat, causing liquid to be drawn upwardly through the stem 20 into the cylinder 18. On the next pressure stroke of the piston the liquid, seeking an outlet, is forced through the opening 52 and emerges in a spray through nozzle 40.

In the modified construction shown in Fig. 6, the inner construction of the spray or pump unit 14^b is identical to that of the first form, and the stopper 32 is also utilized. Further, stem 20^a, spring 26, and conduit extension 24 of Fig. 5 may be employed. Alternatively, the stem 20 of Fig. 1 may be used.

In this form of the invention, the only differences are in the plunger head, nozzle, thumb rest, and cap construction. The head 38^b is shaped substantially similarly to the first form, except for having a continuously extending, external collar 72, the top surface of which has a transverse convexity 74. Opening through the convex surface is a discharge passage 41^b, so that the shoulder or collar 72 defines a nozzle with a single opening, functioning similarly to nozzle 40.

Thumb rest 42^b in this form of the invention differs from the first form in that it does not project outwardly beyond the sides of the head 38^b. Instead, it is of a diameter equal to that of the head, and is formed with a depression in its top surface to receive one's thumb.

The closure cap 66^b is internally threaded at its lower end to engage neck 12, and intermediate its ends, the cap has an enlargement with an internal shoulder 68^b, said enlargement being formed with a transversely concave, downwardly flaring inner side surface 78 complementing the convexity 74 of collar 72. As a result, when cap 66^b is threaded onto neck 12, it depresses rest 42^b and hence the entire plunger 14^b, similarly to the first form. At the time the rest is fully depressed, the enlargement comes to bear tightly against the collar 72, sealing the discharge passage. This eliminates the need for special gaskets, etc., due to the fact that the previous manual closing of the passage 36 of the stopper 32 prevents leakage between the wall of the stopper and the inner surface of neck 12, while closeure cap 66^b prevents evaporation or leakage through the spray device.

While I have illustrated and described the preferred embodiments of my invention, it is to be understood that I do not limit myself to the precise constructions herein disclosed and that various changes and modifications may be made within the scope of the invention as defined in the appended claim.

Having thus described my invention, what I claim as new, and desire to secure by United States Letters Patent is:

A combined closure cap, container, and sprayer comprising a container for liquid including a neck, a closure cap removably fitted about said neck, a stopper engageable in the neck, said stopper having an axial bore and a spray device including a hollow cylinder engaged in and adjustable in the axial bore of said stopper, a tubular stem extending from the cylinder into the container, and

a tubular plunger working in the cylinder, a ball check valve on the stem openable on the suction stroke of the plunger and closable on the pressure stroke thereof to force liquid from the cylinder into the plunger, the plunger further including a discharge nozzle providing an outlet for said liquid and a thumb rest, the cylinder including a collar adapted to bear against one end of the stopper to limit movement of the cylinder axially of the stopper in one direction when the cap is in operative position, the stopper having a longitudinal passage constituting an air vent below the collar for communicating the interior of the container with atmosphere, said collar when engaged against the stopper closing the vent, said closure cap when in operative position on the neck bearing against the thumb rest to shift the plunger through its pressure stroke and maintain the same in the position to which it is so shifted, said cylinder upon downward adjustment carrying said collar against the stopper for sealing the air vent.

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PLAINTIFF'S EXHIBIT Y

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Jan. 20, 1948. F. M. TURNBULL ET AL 2,434,875

JETTING DEVICE

Filed Aug. 11, 1945 2 Sheets-Sheet 1

Fig. 1.

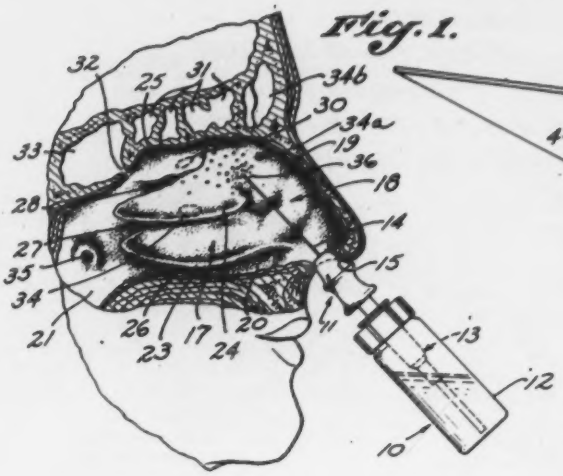


Fig. 2.

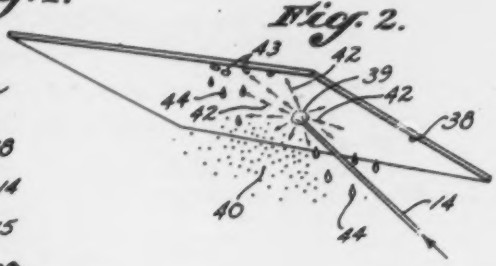


Fig. 5.

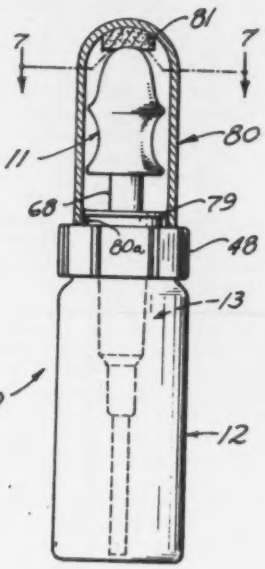
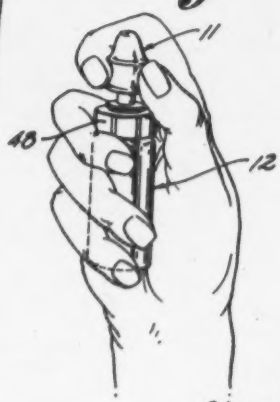


Fig. 3.



Fig. 4.



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Jan. 20, 1948. F. M. TURNBULL ET AL 2,434,875

JETTING DEVICE

Filed Aug. 11, 1945 2 Sheets-Sheet 2

Fig. 6.

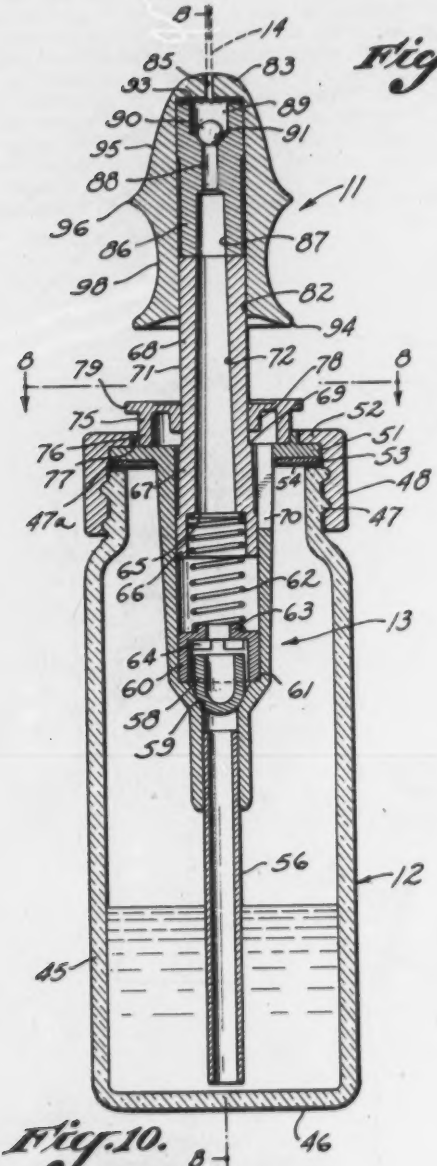


Fig. 7.

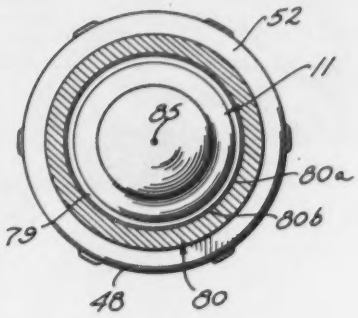


Fig. 8.

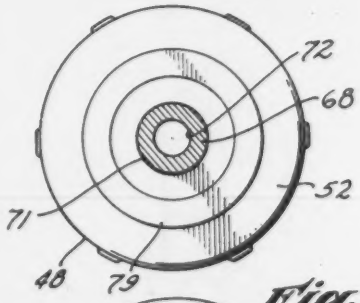


Fig. 9.

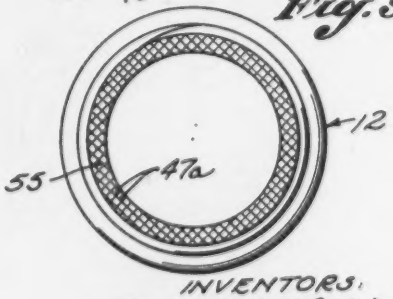


Fig. 10.



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Patented Jan. 20, 1948

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2,434,875

UNITED STATES PATENT OFFICE

2,434,875

JETTING DEVICE

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Application August 11, 1945, Serial No. 610,310

3 Claims. (Cl. 128—250)

1

Our invention relates to liquid jetting devices, particularly to a compact, highly directional device for projecting a needle-like jet of liquid in a direction axially of the device. The invention will be described particularly with reference to its use as a nasal medicator for introducing metered quantities of a liquid medicament into the upper part of the nasal cavity to relieve the congestion of the nasal membranes caused by infections, allergy, hay-fever, etc.; mechanical irritations or physical discomforts arising from dust, sudden change in altitude, etc.; or chemical irritations caused by fumes, etc.

It is an object of the present invention to provide a device having several or all of the following features, to wit, a device which is (1) highly directional and self-directional to direct the medicament automatically to a position high in the nose to reach the seat of the usual nasal infections; (2) readily portable in the sense that it is small and can be easily carried in a pocket or handbag to be available for inconspicuous nasal treatment when needed; (3) precise and capable of delivering a measured dosage of medicaments such as the sulfas, penicillin, vasoconstrictors, or other drugs which should be used in limited doses; (4) sanitary in the sense that the applicator and the medicament can be kept free from contamination; (5) leak-proof to the extent that the device can be carried in any position without danger of leakage, this being true to a large extent even during substantial changes in atmospheric pressure, as during airplane flights; (6) substantially unbreakable, all of the exposed portions of the device being preferably made of plastics; and (7) substantially non-clogging. The importance of these features and their absence from medication devices heretofore known will be apparent from inspection of conventional medicine droppers and atomizers.

To aid in the relieving of infections, often resulting in nasal congestions as in the common nose cold, it is essential to best results that the medicament reach and wet the nasal membranes high in the nose, to wit, in the upper sinus areas, these membranes being at positions disposed substantial distances from the nostril and reached through narrow channels difficult of access by ordinary methods.

The present invention contemplates nasal medication by jetting a measured amount of medicament in a small and usually needle-like stream into the nasal passage to impinge upon the upper interior surfaces. The velocity of impingement is such that the stream breaks up to form a mist-like spray portion comprising a myriad of small droplets of large surface-to-volume ratio which drift from, or are propelled away from, the surface of impingement, migrating through the existing atmosphere to deposit upon and wet other

2

portions of the nasal passage. Thus, the liquid medicament reaches the impingement surface as a jet but then sprays and trickles over the walls of the turbinates into the meati to reach the ostia and the orifice of the Eustachian tube. If the medicament has a vasoconstrictive action, the nasal passage is quickly cleared or decongested.

It is an object of the invention to provide a novel device for nasal medication which jets a small and usually needle-like stream of medicament into the nasal passage and which device is substantially self-directional in the sense that its use, even in non-professional hands, will automatically direct the stream of medicament toward the upper sinus areas.

It is another object of the invention to provide a novel applicator or head shaped to engage the anterior naris or nostril and shaped to limit insertion of the head into the nostril to avoid injury to the nasal tissues.

A further object of the invention is to associate such a head with a pumping mechanism and a liquid container in such way that relative movement between the head toward the container will actuate the pumping mechanism and produce the stream.

Still a further object of the invention is to provide a device with such a head and which is operable to project the stream into the nostril, either by bodily movement of the container toward the nostril while the head fits therein or by finger-induced relative movement between the head and the bottle.

A further object of the invention is to provide a device which is sanitary, in that the head can be easily cleaned, and which prevents contamination of the medicament.

It should be understood, however, that the invention is not limited exclusively to the art of nasal medication. It finds wide usage by doctors, technicians, or artisans in the projection of a minute needle-like liquid jet for general uses and also to remote or difficultly-accessible positions.

In general, it is an object of the invention to provide a liquid jetting device in which the axis of the jet is along the longitudinal axis of the device, whereby this longitudinal axis indicates or predetermines the direction of the jetted stream. The longitudinal axis of the device thus serves as an orienting axis, in contradistinction to those devices in which the direction of a stream or spray cannot be accurately predetermined.

It is an object of the invention to provide a device including pump elements relatively movable in the direction of the desired jet, and to provide a device in which the pump elements are respectively connected to a container and a head, relative movement between the head and container projecting liquid through an orifice of the head

in alignment with the direction of relative movement. Other objects lie in a novel construction of such a head and a novel association thereof with one of the pump elements.

It is also an object of the invention to provide a compact jetting device which can be operated by one hand.

Further objects and advantages will be apparent to those skilled in the art from the following description of an exemplary embodiment particularly applicable to nasal medication.

Referring to the drawings:

Fig. 1 is a vertical sectional view of the left nostril, taken just beyond the septum, showing diagrammatically some of the more important anatomical features of the nasal passage and showing the self-directional jetting device of the invention in operative position;

Fig. 2 is a diagrammatic view illustrating the action taking place when a needle-like jet strikes an inclined surface, and suggesting the mist-like dispersion as well as the paths of liquid flow along the surface;

Fig. 3 is a perspective view showing the preferred one-hand operation of the device;

Fig. 4 is a perspective view showing an alternative method of operating the device;

Fig. 5 is a side view of the device with its protective cover attached, this cover being shown in section;

Fig. 6 is an enlarged vertical sectional view of the device showing the pump elements in the position occupied near the start of the jet-producing action;

Fig. 7 is a cross sectional view, taken as indicated by the line 7—7 of Fig. 5;

Fig. 8 is a cross sectional view, taken along the line 8—8 of Fig. 6;

Fig. 9 is a top view of the container with the pump elements removed; and

Fig. 10 is an enlarged vertical sectional view of an alternative valve construction.

Referring particularly to Fig. 1, the jetting device of the invention is indicated generally by the numeral 10. It provides an applicator or head 11 of a form to be later described and which is movable axially of a bottle or container 12 to actuate a pump 13 in a manner to send a needle-like stream of medicament 14 into the nasal passage. The head 11 is adapted to contact the nostril or anterior naris 15, usually in a manner to seal the nasal passage against ingress or egress of air during the medicating operation.

In Fig. 1, the nasal passage is indicated generally by the numeral 17 and is bounded by the septum of the nose (not shown in Fig. 1), by the outer wall 18 of the nose, and by an upper wall 19 and a lower wall 20, the latter being formed by the hard and soft palates separating the nasal passage 17 from the mouth. The nasal passage 17 is shown as extending rearwardly to a passage 21 comprising the interior of the epipharynx.

Projecting into the nasal passage 17 are lower, middle, and upper turbinates 23, 24, and 25, respectively. The lower turbinate 23 is separated from the lower wall 20 by a space known as the lower meatus 26. The middle and upper turbinates are shown as overlapping slightly but provide therebetween a space opening on the nasal passage and known as the middle meatus 27. Similarly, a passage or space known as the upper meatus 28 opens on the main nasal passage and is positioned between the middle turbinate 24 and the upper turbinate 25. The meati 26, 27, and 28 are small, pocket-like spaces as distinct from broad, open-mouthed depressions or passages, particularly when the nose is congested, and resist entry of a medicament approaching same as an airborne spray, as previously pointed out. Medicinal decongestion requires that the medicament, typically a solution having bactericidal and/or bacteriostatic and also a vasoconstrictive action, must reach the congested zone and, by penetration or gradual decongestion, reach the upper surfaces of the nasal passage, e. g., the medicament must reach the seat of the infection. In this respect it is desirable that the medicament reach and wet the surfaces bounding the turbinates and the meati, particularly the middle and upper meati 27 and 28. It is also desirable that the medicament reach various ostia opening on the meati. For example, the ostia of the ethmoid sinuses, indicated by the numeral 30, lead from the posterior ethmoid cells 31 and open on the upper meatus 26. Also openings on this upper meatus 28 is the ostium 32 of the sphenoid sinus 33. Opening on the middle meatus 27 is the ostium 34 of the maxillary sinus, also the ostia of the anterior ethmoids, not shown in Fig. 1 to avoid confusion, and the ostium 34a of the frontal sinus 34b. To the rear of the meati, the orifice 35 of the Eustachian tube opens on the passage 21.

It is important to the use of the invention as a nasal medicator that the needle-like stream of medicament 14 be directed toward the upper internal surfaces of the nose. When used for this purpose, the present invention is self-directional in the sense that its use practically automatically directs the stream 14 in the desired direction. It is preferable that the stream 14 strike the wall of the nasal passage near the bases of the middle and upper turbinates 24 and 25, it being particularly advantageous if the stream 14 impinges on a surface near the base of the middle turbinate 24, e. g., in or near a zone indicated by the dotted circle 36 of Fig. 1. Preferably, the stream 14 does not substantially diverge or break up into individual droplets prior to impingement near the zone 36. However, upon such impingement, the stream usually breaks up into a mist-like spray portion and a liquid portion. The minute droplets of such a mist-like spray move to and wet the exposed upper surfaces of the nasal cavity. That portion of the medicament which is not broken up into the mist-like spray, and which is termed hereinafter as the liquid portion, flows along the nasal surfaces from the vicinity of the zone 36, either because of the initial velocity of the stream 14 or because of gravitational action. In either instance, the contact of the medicament with the nasal surfaces tends to spread the medicament along the surfaces due to its wetting action. The net result is that the medicament sprays, flows, and trickles into the middle and upper meati 27 and 28 and reaches the walls of the three turbinates 23, 24, and 25. If the medicament has a vasoconstrictive action, it shrinks the turbinates and the tissues surrounding the various ostia. The medicament is conducted into and along the ostia by capillary action and opens the sinuses for drainage and ventilation. A portion of the medicament also reaches the orifice 35 of the Eustachian tube. The overall result is that the entire nasal passage and Eustachian tube are effectively cleared or decongested, and the ostia of the sinuses are open for ventilation and drainage of the sinuses themselves.

The action which takes place when the stream

14 impinges in or near the zone 38 is similar to that illustrated in Fig. 2, which shows the stream 14 directed at an acute angle toward a sloping surface 38, which may be considered as a surface of the nasal passage or a surface of some other body. When the still-integral stream 14 first impinges on the surface 38 in a zone indicated by dotted circle 39, a portion of the liquid breaks up into a mist-like spray. This spray can be observed against a dark background in an appropriate light. It is suggested in Fig. 2 by minute droplets 40 which are propelled from the zone 39 or which drift therefrom through the adjacent air. Another portion of the stream 14 appears not to be thus immediately subdivided and the forward velocity of the stream carries most of this liquid up the inclined surface 38 as a spreading film, although a smaller fraction of the liquid spreads sidewise and in a reverse direction to move film-wise from the zone 39. Such film-wise movement is suggested by arrows 42. As the film spreads, it becomes unstable and appears to break up in part to form surface-adhering droplets 43 which may drain gravitationally along the surface 38 or which may coalesce with other droplets to form larger masses which drop from the surface 38 in a rain-like manner, as suggested by drops 44, which fall freely to any surfaces therebeneath, e. g., to the surfaces, shown in Fig. 1, of the lower turbinate 23 along which such droplets move to enter and coat the walls of the lower meatus 26, or from which they drop to the lower wall 20.

Some such action takes place when the stream 14 impinges against a surface of the nasal passage, although the flows of liquid may be somewhat different than suggested in Fig. 2, depending upon the contour and slope of the impingement surface. However, irrespective of the particular action which takes place, it has been found clinically that this type of jetting action is unexpectedly beneficial in supplying medicament in wetting relationship with the upper internal surfaces of the nose to reach those areas of the nasal passage where the medicament is most needed and which often form the locus of any infection present. Best results arise from a stream 14 which does not substantially break up into droplets prior to impingement, namely, a stream which does not diverge substantially before impingement. However, some degree of divergence can be permitted, particularly if the velocity on impingement is sufficient to break up a portion of the medicament into a mist-like spray which penetrates the meati to reach the various ostia.

Previously, a needle-like stream 14 for nasal medication was neither commonly used nor, in fact, feasible. The present invention has been designed not only to produce the desired stream 14 but to make it self-directional in the sense that its use, even in non-professional hands, will automatically direct the stream toward the upper internal surfaces of the nose. This is accomplished by the particular design of the invention which, aided by its necessary mode of use in nasal medication, directs the stream substantially as suggested.

The details of the preferred embodiment of the invention are best shown in Figs. 5 to 8. Referring thereto and particularly to Fig. 6, the container 12 is preferably of the longitudinally-elongated type to provide a longitudinal axis, indicated generally by the dotted line B—B, and which aids in directionally predetermining the needle-like stream 14, as well as in making the device self-directional when employed as a nasal applicator. This container is usually formed of a suitable plastic, preferably of the transparent type, for example polystyrene, although any material non-reactive with the medicament can be employed. It is of relatively small size, preferably of a size and shape to be retentively encompassed in the palm of the hand. It provides a side wall 46 closed by a bottom wall 46 and preferably provides an externally-threaded neck 47 terminating in an upper annular edge 47a extending substantially radially outward. The neck 47 receives an internally-threaded retaining member or cap 48 formed of a thermoplastic or thermosetting plastic, metal, or other material. The threaded engagement between the neck 47 and the cap 48 is merely exemplary of one form of attachment means, it being clear that other expedients can be employed.

The details of the pump 13 are not, per se, a part of the present invention. Various forms of pumps can be employed, such, for example, as those shown in the patents to Andrew M. Martin, Nos. 2,362,080 and 2,362,081. Fig. 6 illustrates certain details of the pumping structure of the former patent as this type of pump has been found very satisfactory as the pressuring source of the present invention. Generally speaking, the preferred embodiment of the present invention contemplates the use of a pump having two pump elements relatively movable along the axis B—B, one of the pump elements being connected to the container 12 and the other being connected to the head 11, whereby relative movement between the head and the container propels a pump-metered quantity of medicament from the head 11.

The pump shown in Fig. 6 includes a cylindrical barrel 50 having a flange 51 extending outward beneath an inwardly-extending flange 52 of the cap 48. The flange 51 extends outward a substantial distance across the upper annular edge 47a of the neck 47 and a sealing washer 53 is preferably disposed therebetween so that tightening of the cap 48 compresses the washer 53 against the neck 47 and also centers the barrel 50 in the container 12.

In accordance with the present invention, the washer 53 is preferably foil-coated cork to provide a deformable surface 54, usually formed by the foil, engaging the upper annular edge 47a. A very desirable breathing action, tending to equalize the internal and external pressures of the container, is obtained by roughening, knurling, or grooving the entire surface of the upper annular edge 47a, as suggested by the numeral 55 in Fig. 8. If the container 12 is formed of a material softening when heated, a hot file or other toothed tool may be pressed against the annular edge 47a to obtain the roughening, or other expedients can be employed. This forms minute depressions in the annular edge 47a which are usually in some predetermined pattern but which cooperate with the deformable surface 54 in providing a plurality of minute passages of sufficient size to permit a slow leakage of air tending to equalize internal and external pressures, but of insufficient size to permit gravitational flow of the liquid upon upturning the container or placing it on its side. If the surface 54 is not deformable or if the washer 53 is eliminated to permit the flange 51 to engage the roughened annular edge 47a, the engaging surface will merely bridge across the minute depressions without substantial deformation, and the depth thereof will determine the minimum size

of the minute passages. However, if the surface 54 is deformable, tightening of the cap 48 will force the crests of the roughened annular edge 47a slightly into the deformable surface 54 so that the size of the minute passages is reduced as the cap is tightened. With the usual manual tightening of the cap 48 to press the foil-coated washer 53 against the roughened annular edge 47a, minute depressions of a depth between about .025–.05 mm., or slightly more, will be found satisfactory with a liquid of about 40 centipoises. With other liquids, deeper or more shallow depressions will be desirable, depending on the physical properties of the liquid. When using a deformable surface 54, grooves of undue depth can be formed in the annular edge 47a and tightening of the cap 48 will decrease this depth to the desired amount by deforming the surface 54 to extend a distance into the grooves to decrease the size of the remaining passages. In practice, the cap 48 is tightened until there is no gravitational leakage of the liquid when the container is upturned or on its side, the size of the minute passages being then such as to admit a slow flow of air tending to equalize the internal and external pressures.

The lower end of the barrel 50 provides a reduced-diameter portion which receives the upper end of an intake tube 56 opening just above the bottom wall 46 of the container, the upper end of the tube 56 being suitably adhered to the reduced-diameter portion.

Near the lower end of the barrel 50 is an intake valve, shown as including a hollow valve member 58 having a hemispherical lower end adapted to seal against a conical valve seat 59 provided by the barrel 50 to resist movement of liquid from the interior of the barrel 50 through the intake tube 56 but to permit free reverse movement. The valve member 58 moves vertically in a cage 60 held in engagement with a shoulder 61 of the barrel 50 by a spring 62. The lower end of this spring surrounds an upstanding flange 63 of the cage which centers the spring. The interior of the cage 60 is of sufficient height to permit a small vertical movement of the valve member 58. When liquid is flowing upward in the intake tube 56 into the barrel 50, the valve member 58 rises into engagement with a plurality of stops 64 spaced to provide passage means accommodating the upward flow.

The barrel 50 and its associated structure thus far described may be considered as comprising one of the pump elements of the invention, removably connected to the container 12 by the cap 48. The other pump element is movable relative thereto along the axis B—B and includes, in general, a hollow plunger 65 comprising a piston portion 66, a tapered portion 67, and a liquid-conducting, pump-actuating member 68 there being an annular shoulder 69 at the junction of the tapered portion 67 and the actuating member 68. The piston portion 66 provides a shouldered recess receiving the upper end of the spring 62, whereby this spring not only holds the cage 60 in position but also resiliently urges the hollow plunger 65 upwardly. The piston portion 66 is only slightly smaller than the interior of the barrel 50 to minimize leakage of pumped liquid therebetween. In normal use, this leakage is very small but, if present, is returned to the liquid in the container 12 through a slot 70 formed longitudinally in the upper end of the barrel 50 and traversing the flange 51. This slot also maintains the pressure on the upper portion of the piston portion 66 equal to the pressure on the liquid in the container 12 and produces other desirable results, such as set forth in the aforesaid patents.

The actuating member 68 provides a cylindrical exterior surface 71 and a liquid-conducting passage 72, both coaxial with the axis B—B. The pump-actuating member 68 is movable relative to the container along this axis and, during such movement, is additionally guided by a retaining member 75 which, in the present invention, serves several purposes. This retaining member 75 provides a skirt 76 telescoping within and suitably adhered to an upstanding collar 77 of the flange 51. This collar 77 has an external diameter slightly smaller than the internal diameter of the flange 52 of the cap 48 and serves to journal the cap and to centralize the barrel 50 with respect to this cap. The retaining member 75 also has a depending flange 78 which closely surrounds and slidably journals the exterior surface 71 of the pump-actuating member 68. This depending flange serves several functions. In the first place, it serves as a wiper for the exterior surface 71 as the actuating member 68 moves upward. In the second place, it surrounds this exterior surface sufficiently closely to provide a relatively good sealing action preventing a gravity flow of liquid from the container 12, even though the device is upturned or if the axis B—B is horizontal. In this connection, it should be understood that auxiliary sealing means can be provided at this point, if desired, but this is usually not necessary and, if used, should still, during operation of the device, permit passage of a small amount of air necessary to compensate for liquid displaced from the container 12. In the embodiment shown, such displacement air enters the container through the junction of the depending flange 78 and the pump-actuating member 68 during relative movement therebetween but without permitting substantial or objectionable leakage of liquid. In the third place, the lower end of this depending flange serves as a stop engaged by the annular shoulder 69 to limit the extended position of the hollow plunger 65 under the action of the spring 62.

In addition, the retaining member 75 provides an outwardly-extending flange 79 serving a dual purpose. Thus, this flange 79 is of a diameter slightly larger than the internal diameter of the flange 52 of the cap 48 so as to prevent detachment of the cap 48 from association with the pump elements when the entire pumping structure is removed from the container 12. Also, in accordance with the present invention, this flange 79 forms a support for a tubular, closed-ended and preferably domed cover 80 (see Figs. 5 and 7), preferably having a cylindrical side wall of such internal diameter as to be slid over the flange 79 and to be held in place by friction against accidental removal. The cover 80 protects the head 11 from contamination or accidental movement when the invention is carried in the pocket or handbag. In the preferred construction, the lower portion of the cylindrical side wall provides at least three minute inwardly-extending projections 80a which engage the flange 79, leaving narrow intervening annular spaces 80b permitting passage of air to equalize the pressures inside the cover 80 and surrounding the container 12 but of such narrow dimension as to prevent passage of the liquid except under pressure. Thus, any accidental leakage between the retaining member 75 and the pump-actuating member 68 is retained in the cover 80.

If desired, a small cushion member 81 of sponge rubber or other soft material may be adhered in the upper interior of the domed cover 80 to engage the head 11 in orifice-sealing relationship. This member 81 may adsorb or take up medicament from the orifice which it seals or it may be otherwise wetted with the medicament from time to time. In either event it not only prevents any drying of the medicament in the orifice but also sterilizes the surface of the head 11 which it engages if the medicament has an antiseptic action.

The head 11 forms an important part of the present invention and is constructed as best shown in Figs. 5, 6, and 7. In general, it provides a body, externally contoured as later described, and having a central opening 82 within which the upper end of the pump-actuating member 68 is suitably adhered. Extending across the upper end of the opening 82 is an end wall 83 formed integrally with the remainder of the head 11 and providing a discharge orifice 85 axially aligned with the axis B—B. The function of the pump 13 is to deliver to the inner or entrance end of this discharge orifice 85 a pressured stream of the medicament or other liquid which is to be jetted from the device. The function of the orifice 85 is to form this liquid into a needle-like stream 14. In practice, the orifice 85 can be shaped to produce the particular stream desired. The preferred orifice for the invention, when used as a nasal medicator or for other purposes, is a minute cylindrical-walled orifice having a diameter between about .008" and .012", preferably .010", this diameter determining the diameter of the needle-like stream 14 immediately upon expulsion. In the preferred practice, the axial length of the orifice 85 is at least twice the diameter and preferably from two to ten times this diameter, a very satisfactory length for a nasal medicator being about $\frac{1}{32}$", or slightly more. The orifice 85 is usually formed during the molding operation and its size is such that no medicament will flow gravitationally therethrough if the device is upturned.

In the preferred construction, a tubular element 86 is disposed in the central opening 82 between the end of the pump-actuating member 68 and the end wall 83, and serves numerous functions. The lower end of this tubular element 86 provides a passage 87 axially aligned with, and forming a continuation of, the liquid-conducting passage 72. Toward its upper end, this passage is constricted, as indicated at 88, and opens into a valve chamber 89 in which is disposed a valve element 90 adapted, when in its lower position, to engage in sealing relationship a conical valve seat 91 of the tubular element 86. The valve member 90 is shown as a small sphere, typically a small ball bearing sufficiently smaller in diameter than the valve chamber 89 to move freely therein, while permitting passage of the liquid in the zone between the valve member and the side wall of the chamber 89.

A small disc-like filter or strainer 93 is disposed in the extreme upper end of the central opening 82 just below, and preferably extending across the entrance portion of, the orifice 85. This strainer is preferably formed of metal screen, usually stainless steel screen of about 100 mesh, and has an outer diameter substantially corresponding to the diameter of the central opening 82. The upper end of the tubular element 86 bears annularly against the lower portion of this screen and aids in retaining it in place.

Such a screen-type filter serves many desirable functions in the device. In the first place, it strains the liquid discharging through the small orifice 85 and prevents clogging thereof by any particles which might have accidentally entered the liquid medicament. In the second place, it serves as a stop for the upward movement of the valve member 90. This value member engages the lower portion of the screen in a zone beneath the orifice 85 and such engagement tends to clean the screen in the central area which feeds the orifice. In the third place, the screen is of such small mesh that it remains wetted with the liquid medicament, thus tending to prevent any leakage of air into the device through the orifice and thus aiding the upper valve structure in preventing any loss of prime of the pump. When the cover 80 is in place, the cushion member 81 aids further in this connection.

The length of the tubular element 86 preferably determines the maximum stroke and, thus, the maximum discharge per stroke which, preferably, is less than the total dosage of medicament desired so that a predetermined number of actuations, usually three, is required to expel the prescribed dosage, thus preventing a part of the dosage from running from the nose, as might be the case if discharged in a single actuation. In this connection, the maximum inward movement of the pump-actuating member 68 and its attached piston portion 66 is preferably determined by engagement between a lower lip 94 of the head 11 and the upper surface of the retaining member 76. In assembling the device, the position of this lip 94 with respect to the pump-actuating member 68 is determined by the length of the tubular element 86. Shortening of this tubular element will produce a shorter stroke, with correspondingly decreased dosage, while lengthening of the tubular element will increase the stroke, with correspondingly increased dosage. In this way, selection of a tubular element 86 of appropriate length predetermines the maximum dosage of the device per stroke or actuation.

The external contour of the head 11 contributes importantly to various usages of the invention. The self-directional character of the invention, when used for nasal medication and its effectiveness for this purpose, is substantially aided by an appropriate design of the applicator end of the head 11. Preferably, the upper or applicator end of this head provides a rounded nostril-engageable surface 95 of a size to engage the nostril or the anterior naris. This shape of the surface 95 can be made to serve two desirable functions. In the first place, it insures substantial centering of the stream 14 with respect to the nostril. In the second place, it can deform the nostril into substantially circular contour and engage same in substantially air-sealing relationship to prevent any substantial ingress or egress of air during the medicating operation. This is desirable as preventing drafts or currents of air which might quickly displace the mist-like spray from its desired environment, either by drawing it into the throat or expelling it through the nostril.

At the base of the surface 95 is a rounded ledge 96 serving to prevent too deep a penetration of the head 11 into the nasal passage by engagement with the anterior naris or nostril.

The head 11 also provides finger-engageable means for actuation of the pump when the container is held in the hand and the head 11 is engaged by one or more fingers of this hand. Pref-

erably, the head provides finger-engageable means adapted to be engaged by two adjacent fingers or by the end of the thumb. The preferred construction provides finger-engageable depression means on opposite sides of the head to receive facing surfaces of two adjacent fingers of a hand while the container 12 is held exclusively by this hand. At the same time, it is desirable that the device should not require orientation about the axis B—B preparatory to being placed in operative position in the hand. For this purpose and other reasons, the preferred finger-engageable depression means comprises a shallow circular depression 98 extending completely around the head 11, preferably at a position between the rounded ledge 96 and the lower lip 94. The utility and advantages of such a finger-engageable depression 98 will be more fully apparent from the subsequent description of the mode of use of the invention.

Preferably, all of the elements of the device are made of a material non-reactive to the liquid medicament to be jetted, thus preventing any contamination thereof, either in the container 12 or during passage through the pump elements. In practice, we find it desirable to make as many of the elements as possible of thermoplastic or thermosetting resins. The head 11 and all of the elements of the pump 13, with the exception of the spring 62 and in some instances the valve element 90, can best be made of a polyvinyl chloride-polyvinyl acetate copolymer, e. g., a material known as Vinylite. Such a material is excellently suited to the apparatus and has long-wearing characteristics. The container 12 is preferably made of molded polystyrene and the domed cover 80 can desirably be molded methyl methacrylate, e. g., a material known as Plexiglas or Lucite, thus minimizing breakage during rough handling or upon droppage of the device.

In assembling the elements of the device, the pump elements are preferably first associated. The assembly can be accomplished, for example, in the following manner, it being clear that the words "adhered," "adhering," etc., have reference to any pressing, cementing, or other structurally-unifying operation tending to affix the parts in relatively permanent relationship. The valve member 58 and the cage 60 are dropped into the barrel, with the spring 62 in place, and the hollow plunger is lowered to compress the spring. The cap 48 is then positioned around the collar 77 and the retaining member 76 is then adhered within this collar. Preparatory to attaching the head 11, the strainer 97 is disposed in the central opening 82 and the tubular element 86 is then forced into this opening 82 with the valve element 90 in position. The upper end of this tubular element 86 preferably makes a press fit with the opening 82 and its lower end is somewhat relieved to provide for the reception of a suitable substance facilitating the adhering. The head 11 is then adhered to the upper end of the pump-actuating member 68. The washer 53 is then slipped around the barrel 50 and the intake tube 56 is then adhered to the barrel 50.

The container 12 is then filled to any desired level with the medicament, and the previously associated elements are then attached to the container in the relationship shown in Fig. 6 by tightening the cap 48. The head 11 is then moved toward the container 12 one or two times until the pump 13 is primed and the internal passages are completely filled with the medicament to and including the valve chamber 88, and preferably the orifice 85. The device is now ready for metered discharge of the medicament.

In using the device for nasal medication, the preferred orientation, aiding substantially in the self-directional character of the invention, is suggested in Fig. 3, showing operation by a right-handed person. Here, the index finger and the second finger of the right hand are pressed into the circular depression 98, the thumb engaging the bottom wall 46. The fingers engaging the depression 98 are then moved toward the thumb. This moves the head 11 toward the container 12, the reaction force being taken by the thumb. This is done after the surface 95 has been engaged with the nostril so that the head 11 extends a short distance into the nasal passage. This method of holding the jetting device of the invention, combined with the engagement between the head 11 and the nostril, insures delivery of the stream 14 to impinge on the upper internal surfaces of the nose. During such actuation of the device, a patient will automatically orient the axis B—B in the desired direction, any attempt to substantially displace this axis from its desired relationship with the nose representing an unnatural or uncomfortable method of actuating the device. When the device is oriented in the hand as suggested in Fig. 3, it is almost automatically "aimed" properly by the motions necessary to the actuation.

So, also, when the device is used for purposes other than nasal medication, its relationship with the human hand, suggested in Fig. 3, represents an accurate "aiming" as the thumb is aligned with the axis B—B and the first and second fingers are on opposite sides thereof—a natural "aiming" position. When the device is used in this manner for eye or throat irrigation, it is remarkably directive, even in hands unaccustomed to the device, in the sense that the device can be accurately "aimed" so that the direction of the stream 14 is predetermined.

Another method of holding the device, which is almost equally satisfactory and which is preferred particularly if the device is to be used for inconspicuous nasal medication in public places, is suggested in Fig. 4. Here, the device is held in the palm of the hand, with the container partially encircled by the second, third, and fourth fingers. The thumb and index finger press into opposite sides of the circular depression 98. Here again, when the device is brought into contact with the nostril, the axis B—B will naturally be disposed to direct the stream 14 to the desired surfaces of the nasal cavity. To expel the liquid, the thumb and first finger are moved toward the palm of the hand, the reaction force in this instance being taken either by the encircling fingers or by the bottom of the container, which rests in the palm of the hand. When used in the position shown in Fig. 4, the device can also be "aimed" with very substantial accuracy, thus facilitating employment of the device for purposes other than nasal medication.

Another similar method of using the device is to place only the end of the thumb in the circular depression 98 while the remaining fingers encircle the container. The thumb is moved toward the container to advance the head and actuate the pump.

The device can also be employed for nasal medication merely by grasping the container and forcing the container toward the head 11 while the surface 95 of this head is in contact with the

nostril. The rounded ledge 96 serves as a stop for preventing undue penetration of the head into the nasal cavity. In this instance, the reaction force is taken by the nose itself and, again, the device will automatically be used in such way as to jet the stream 14 in the correct and most advantageous direction.

It is sometimes desirable to use a spring-loaded valve member in the head 11. This can be accomplished by interposing a light compression spring between the valve member 98 and the strainer 93, or the alternative valve member shown in Fig. 10 can be used. As shown in Fig. 10, the conical valve seat 91 is engaged by a conical portion 100 of a valve member 101 molded of suitable plastic material and being hollow to lessen its weight. This valve member 101 provides a tongue 102 of smaller diameter than the constricted passage 88 and preferably tapered, as shown, to guide the to and fro movement of the valve member and retain its orientation relative to the seat 91. The upper end of the valve member provides an annular recess which receives and centers the lower end of a spring 105 compressed between the valve member 101 and the strainer 93. The spring tension should be just sufficient to hold the valve member against the seat 91 when the device is inverted, thus preventing any air flow into the pump when the device is operated in any position where gravity tends to unseat the valve, e. g., when the jet is angled downwardly from the horizontal. The requisite spring tension is very small and does not interfere with a lifting of the valve member by the liquid during actuation of the device.

The device herein described in detail, provided with an orifice of 0.01" in diameter, develops sufficient pressure to jet a stream which holds together for at least a foot or more and which then breaks up into small droplets which will carry to a surface six or eight feet away and impinge in a circular area having a diameter of only a few inches.

One feature of the device is that it may be carried without danger of leakage even when subjected to change in atmospheric pressure. With the construction hereinbefore described, a change in atmospheric pressure is transmitted to the interior of the cover 86 through the spaces 86b and to the interior of the container 12 through the minute passages between the washer 53 and the depressions of the upper annular edge 47a. Thus, if the structure is upright or in any position in which the liquid does not submerge the entrance portions of all of the aforesaid minute passages, e. g., if it is not in an upturned position, such breathing of air into and from the cover 86 and into and from the container 12 will prevent pressure differentials which might expel liquid through the pump. In the absence of such features, a reduction in atmospheric pressure, as by carrying the device to a higher altitude, may cause a column of liquid to rise in the pump and discharge from the orifice 85. Even then, however, such discharge is retained in the cover 86 and does not leak therefrom unless all of the spaces 86b are closed by the liquid and sufficient pressure differentials are developed to force the liquid therethrough. Even if the device is upturned so that the entrance portions of all of the minute passages hereinbefore mentioned are submerged, any such reduction in atmospheric pressure will cause discharge into the cover 86 of only that small amount of liquid in the pump. In such upturned position, the open end of the intake tube 56 communicates with the air in the container 12 and the pressure differential is relieved through the passages of the pump, the valve members 58 and 98 being then gravitationally displaced from their respective seats and the strainer 93 preventing the valve member 98 from closing the orifice 85.

Various changes and modifications can be made without departing from the spirit of the invention as defined in the appended claims.

We claim as our invention:

1. In a device for injecting a jet of liquid medicament into the nasal cavity, the combination of, an applicator head having a rounded end fitting the entrance to the nostril, said head also having an axially directed orifice centrally disposed in said end for directing a thin stream of said liquid medicament through said nostril into contact with the upper sinus areas, and a liquid measuring pump between a source of liquid medicament and said head for withdrawing liquid medicament from said source and forcing a measured volume thereof under pressure through said orifice.

2. In a device for injecting a jet of liquid medicament into the nasal cavity, the combination of, an applicator head having a rounded end fitting the entrance to the nostril, said head also having an axially directed orifice centrally disposed in said end for directing a thin stream of said liquid medicament through said nostril into contact with the upper sinus areas, a container for holding a body of said liquid medicament and having a longitudinal axis in substantial alignment with the axis of said head and orifice, a liquid supply tube in said container and a liquid measuring pump for withdrawing liquid medicament from said body through said supply tube and forcing a measured volume of said liquid medicament under pressure through said orifice.

3. In a device for injecting a jet of liquid medicament into the nasal cavity, the combination of, an elongated applicator head having a rounded end fitting the entrance to the nostril and having a peripheral groove spaced axially from said end and constituting finger engaging means, said head also having an axially directed orifice centrally disposed in said end for directing a thin stream of liquid medicament through said nostril into contact with the upper sinus areas, a supply tube for said liquid medicament, and a liquid measuring pump between said supply tube and said orifice for forcing a measured volume of said liquid medicament through said orifice upon relative movement of said head and supply tube toward each other.

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The following references are of record in the file of this patent:

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Certificate of Correction

Patent No. 2,434,875. January 20, 1943.

FREDERICK M. TURNBULL ET AL.

It is hereby certified that error appears in the printed specification of the above numbered patent requiring correction as follows: Column 10, line 8, for "value" read *valve*; and that the said Letters Patent should be read with this correction therein that the same may conform to the record of the case in the Patent Office.

Signed and sealed this 20th day of April, A. D. 1948.

[SEAL]

THOMAS F. MURPHY,
Assistant Commissioner of Patents.

P's Cp. DD 429

[illegible] SPRAYER

PRICES

QUANTITY	PRICE PER THOUSAND
1,000	$84.00 per thousand
5,000	81.00 per thousand
10,000	79.00 per thousand
25,000	77.00 per thousand
50,000	76.00 per thousand
100,000 and up	Annual Contract quoted on request

TERMS:

TERMS: 1% 10 Days — Net 30
F.O.B. Kansas City, Missouri
MINIMUM ORDER: 1,000 Sprayers to case
CASE WEIGHT: 34 lbs.

COLORS:

ALL WHITE or WHITE plunger with RED, BLUE, GREEN or YELLOW head and collar. Be sure to specify color when ordering.

Special color combinations available in quantities of 100,000 or more. Prices quoted on request.

CAPS:

Available in stock in following sizes and colors:

WHITE METAL—20, 22, 24, 26, 28, 33mm, 400 finish
BLUE METAL—26 & 28mm
YELLOW METAL—28mm
BLACK BAKELITE—24 & 28mm—$3.00/M extra
WHITE UREA—24 & 28mm—$6.00/M extra

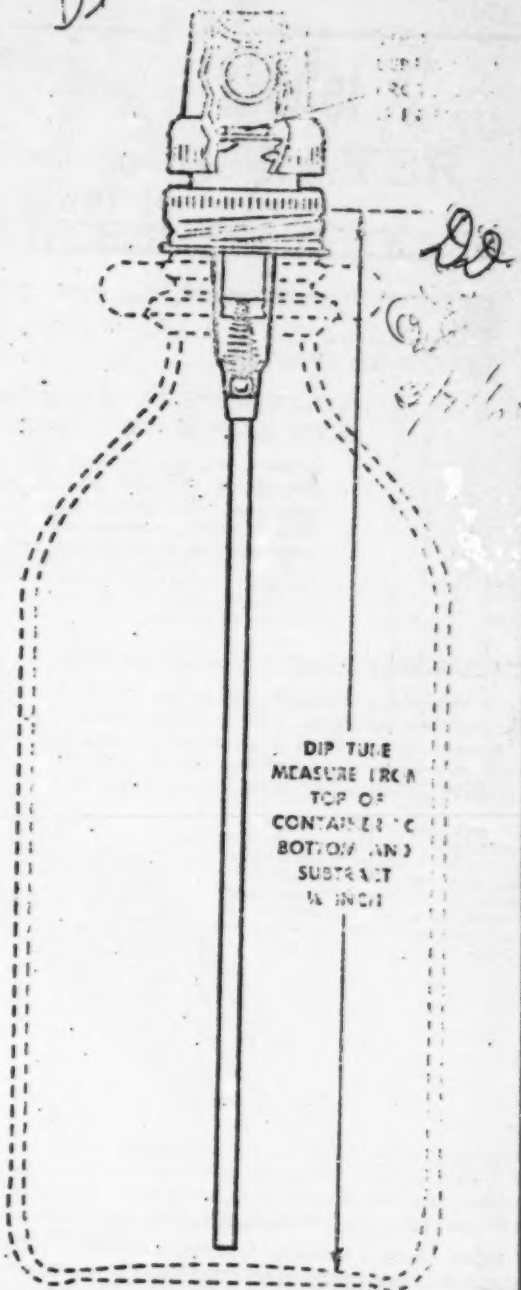
Seaton can furnish metal or molded caps in any size or color in quantities of 100,000 or more. Prices quoted on request.

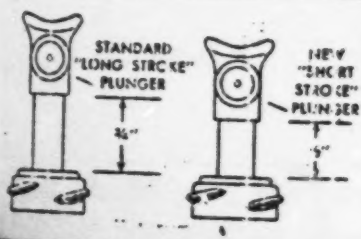
If customer furnishes molded caps, there will be a boring charge of $2.50/M.

DIP TUBES:

Dip tubes will be cut to any desired length at no additional cost. When ordering specify over-all length from top of container to desired depth. Please submit sample bottle or container to insure accuracy.

NOTE: When ordering be sure to specify: Model Number, Cap size and color, Sprayer color, Dip Tube length, Plunger (standard or short).





NEW SHORT STROKE PLUNGER NOW AVAILABLE

Seaton sprayers may now be equipped with the new short stroke plunger which delivers less volume and is specifically designed for products such as window cleaners, spot removers, hair sprays, etc.

The standard, long stroke plunger is ideally suited for insecticide and other products where delivery of greater volume per stroke is desired.

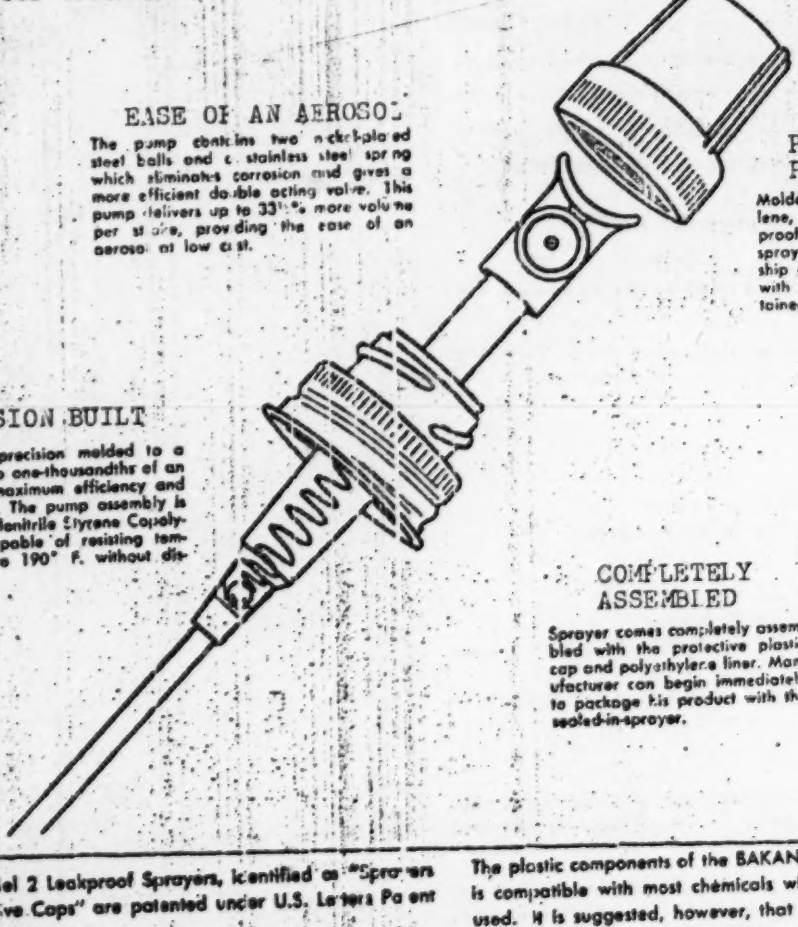
When ordering specify short plunger if desired. Unless otherwise specified, sprayers will be equipped with standard, long stroke, plunger.

430

BAKAN Sprayed and Dispensers

DESIGNED FOR HIGH QUALITY, AT LOW COST! ADDS STYLE AND PERFORMANCE TO ANY PRODUCT

INTRODUCING THE B A K A N MODEL 2 LEAKPROOF SPRAYER:



EASE OF AN AEROSOL

The pump contains two nickel-plated steel balls and a stainless steel spring which eliminates corrosion and gives a more efficient double acting valve. This pump delivers up to 33⅓% more volume per stroke, providing the ease of an aerosol at low cost.

PROTECTIVE PLASTIC CAP

Molded of high quality polyethylene, it provides a sealed, air-proof, protective cover for the sprayer. Enables manufacturer to ship and merchandise his product with a sprayer sealed in the container—ready to use.

PRECISION BUILT

All parts are precision molded to a tolerance of two one-thousandths of an inch, insuring maximum efficiency and operating ease. The pump assembly is molded of Acrylonitrile Styrene Copolymer (TYRIL) capable of resisting temperatures up to 190° F. without distortion.

COMPLETELY ASSEMBLED

Sprayer comes completely assembled with the protective plastic cap and polyethylene liner. Manufacturer can begin immediately to package his product with the sealed-in-sprayer.



NOTE: Model 2 Leakproof Sprayers, identified as "Sprayers with Protective Caps" are patented under U.S. Letters Patent No. 2,870,943

The plastic components of the BAKAN Model 2 Leakproof Sprayer is compatible with most chemicals where sprayers are commonly used. It is suggested, however, that each product be thoroughly tested with the sprayer to make sure they are compatible.

DISTRIBUTED BY:

BAKAN Plastics 2500 SUMMIT, KANSAS CITY 41, MISSOURI

PLAINTIFF'S EXHIBIT EE

431

BAKAN
PLASTIC SPRAYERS & DISPENSERS

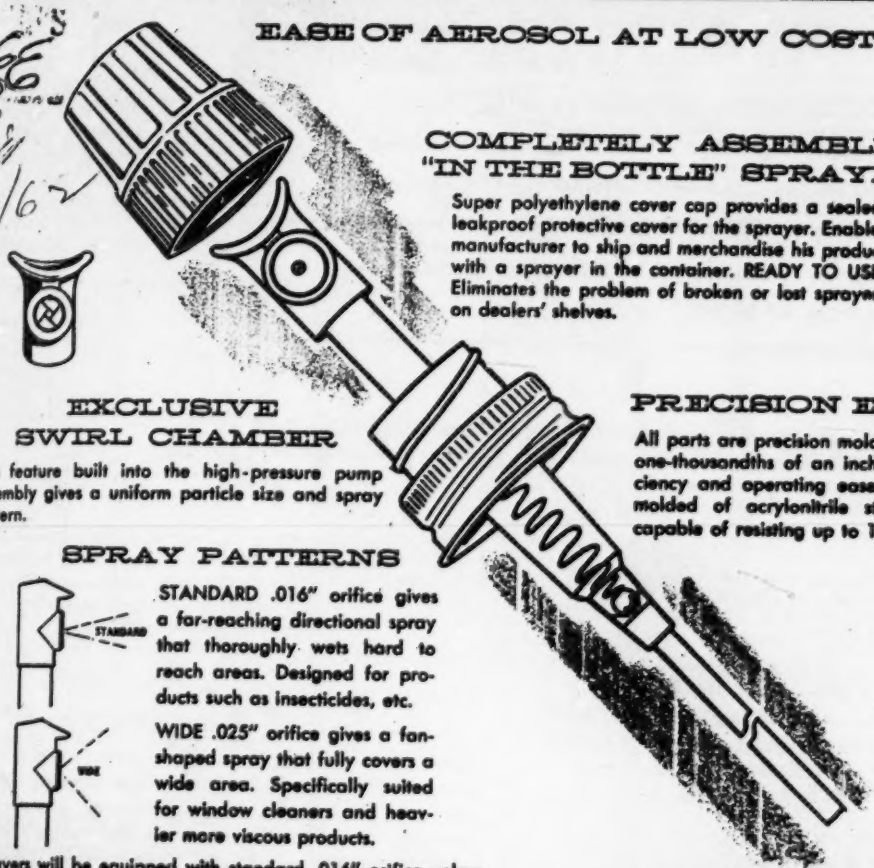
Model 2 SPRAYER
with
PROTECTIVE COVER CAP

EASE OF AEROSOL AT LOW COST



COMPLETELY ASSEMBLED "IN THE BOTTLE" SPRAYER

Super polyethylene cover cap provides a sealed, leakproof protective cover for the sprayer. Enables manufacturer to ship and merchandise his product with a sprayer in the container. READY TO USE. Eliminates the problem of broken or lost sprayers on dealers' shelves.



EXCLUSIVE SWIRL CHAMBER

This feature built into the high-pressure pump assembly gives a uniform particle size and spray pattern.

PRECISION ENGINEERED

All parts are precision molded to a tolerance of two one-thousandths of an inch, insuring maximum efficiency and operating ease. The pump assembly is molded of acrylonitrile styrene copolymer (Tyril) capable of resisting up to 190° F. without distortion.

SPRAY PATTERNS

STANDARD .016" orifice gives a far-reaching directional spray that thoroughly wets hard to reach areas. Designed for products such as insecticides, etc.

WIDE .025" orifice gives a fan-shaped spray that fully covers a wide area. Specifically suited for window cleaners and heavier more viscous products.

Sprayers will be equipped with standard .016" orifice unless otherwise specified.

NOTE: Model 2 Sprayers, identified as "Sprayers with Protective Caps" are patented under U.S. Letters Patent No. 2,870,943.

The plastic components of the BAKAN Model 2 Sprayer are compatible with most chemicals where sprayers are commonly used. It is suggested, however, that each product be thoroughly tested with the sprayer to make sure they are compatible.

distributed by:

BAKAN PLASTICS
DIVISION OF COOK CHEMICAL COMPANY
P.O. BOX 78 ● 2500 SUMMIT ● KANSAS CITY 41, MISSOURI

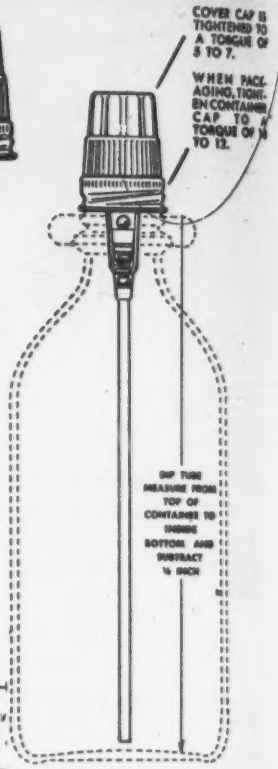
432

Model 2 BAKAN SPRAYER

PRICES

QUANTITY	PRICE PER THOUSAND
1,000	$88.00 per thousand
5,000	81.00 per thousand
10,000	79.00 per thousand
25,000	77.00 per thousand
50,000	76.00 per thousand
100,000 and up	Annual Contract quoted on request





TERMS

F.O.B. Kansas City, Missouri CASE WEIGHT: 34 lbs.

MINIMUM ORDER: 1,000 Sprayers to case

COLORS:

ALL WHITE or WHITE plunger with RED, BLUE, GREEN or YELLOW head and collar. Be sure to specify color when ordering. Special color combinations available in quantities of 100,000 or more. Prices quoted on request.

CAPS:

Available in stock in following sizes and colors:

WHITE METAL—20, 22, 24, 26, 28, 33mm, 400 finish
BLUE METAL—26 & 28mm
YELLOW METAL—28mm
BLACK BAKELITE—24 & 28mm—$3.00/M extra
WHITE UREA—24 & 28mm—$6.00/M extra

BAKAN can furnish metal or molded caps in any color or size from 20mm to 38mm. Prices quoted on request. If customer furnishes caps, there will be a boring or punching charge of $2.50/M plus an additional $2.50/M for liner removal, if required.

SPRAY PATTERNS . . .

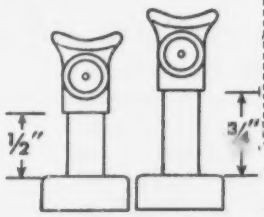
STANDARD .016" orifice gives a far-reaching directional spray that thoroughly wets hard to reach areas. Designed for products such as insecticides, etc.



WIDE .025" orifice gives a fan-shaped spray that fully covers a wide area. Specifically suited for window cleaners and heavier more viscous products.



Sprayers will be equipped with standard .016" orifice unless otherwise specified.



PLUNGERS

Bakan sprayers may be equipped with the short stroke plunger which delivers less volume and is specifically designed for products such as window cleaners, spot removers, hair sprays, etc. The standard, long stroke plunger is ideally suited for insecticides and other products where delivery of greater volume per stroke is desired.

When ordering specify short plunger if desired. Unless otherwise specified, sprayers will be equipped with standard, long stroke, plunger.

DIP TUBES

SEMI-RIGID STANDARD DIP TUBES will be cut to any desired length at no additional cost. FLEXIBLE DIP TUBES are available at an additional cost of $5.00/M.

When ordering specify over-all length from top of container to desired depth. Please submit sample bottle or container to insure accuracy.

NOTE: When ordering be sure to specify (1) Model Number, (2) Cap Size and Color, (3) Sprayer Color, (4) Dip Tube Length. And, if desired, (1) Short Stroke Plunger, (2) Wide Spray Orifice, (3) Flexible Dip Tube.

PLAINTIFF'S EXHIBIT FF

433

BAKAN

PLASTIC SPRAYERS & DISPENSERS

DIVISION OF COOK CHEMICAL COMPANY • BOX 78 KANSAS CITY 1 MISSOURI

MARK 100

All New! TROMBONE JET SPRAYER

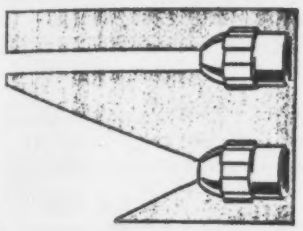
molded of DuPont chemically resistant **DELRIN®**



PLAINTIFF'S
Exhibit FF 3/8/62

ADJUSTABLE NOZZLE

The Mark 100 has an adjustable "screw-in-screw-out" nozzle. Works just like a garden hose nozzle. Sprays a 15 foot stream or a fine mist! Delivers 6 cc per stroke—six strokes per ounce!



PRECISION ENGINEERED

Molded of DuPont's Delrin acetal resin, which offers you metal-like mechanical properties, high degree of strength, resilience and toughness. Chemically compatible.

COLORS

Available in deep sky blue. Special colors in quantities of 10,000 or more.

SPECIAL METAL HANDLES*

We can furnish a specially designed snap-in handle for F style Half-Gallon or Gallon cans. Prices on request.

PRICES FOR BASE SPRAYER

200	$ 75 ea.
1,000	.70 ea.
5,000	.65 ea.
10,000	.62½ ea.

F.O.B. Kansas City, Missouri
Pack: Bulk
Minimum Order: 200

CAPS

The sprayer can be equipped with any size and style metal or molded cap. Bakan can furnish caps in most sizes from inventory (price list furnished or request). Caps must be punched or bored. Cost .0035 per unit.

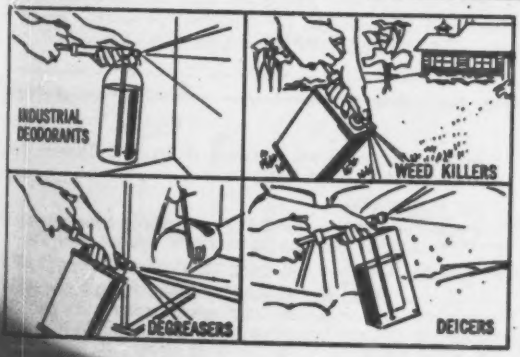
DIP TUBES

Bakan stocks flexible Polyethylene dip tubes in three standard lengths only:

7" Included in base price
10" .0045 per unit
13" .0090 per unit

VALVE BALLS

Equipped with two nickel plated balls. For stainless steel add .008 per unit.



100 and One Uses...

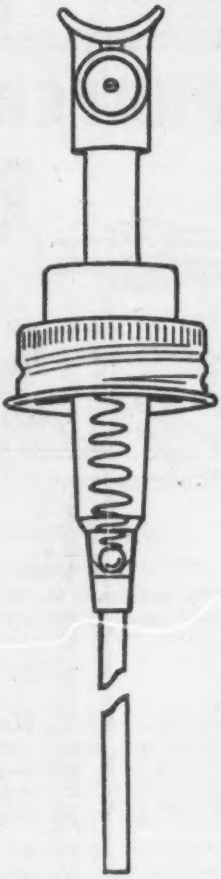
The Mark 100 is designed to fit plastic, metal or glass, pint or quart containers. Particularly useful with an F style Half Gallon or Gallon can with special metal handle.

The Mark 100 is perfect for spot spraying... white sidewall cleaners... industrial deodorants... rose sprays... liquid fertilizers... deicers... carpet cleaners... spot weed and crabgrass killers... fungicides and germicides... fireproofing liquids... engine degreasers... machine and equipment cleaners... tile, metal and floor cleaners.

434

BAKAN SPRAYERS

MODEL 1

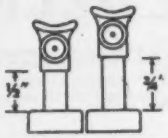


EXCLUSIVE SWIRL CHAMBER

This feature built into the high-pressure pump assembly develops up to 150 lbs. pressure at orifice which gives uniform particle size and spray pattern.

SHORT AND LONG PLUNGER

The short plunger delivers .6 cc per stroke and is specifically designed for window cleaners, starches, hair sprays, etc. The long stroke plunger delivers .9 cc per stroke and is recommended for residual insecticides. UNLESS otherwise specified Model 1 Sprayer will be equipped with short stroke plunger.



COLORS



All white or white plunger and orifice with red, blue, green or yellow head and collar available from stock.

PRICES— 525

Base Sprayer Without Cap

1,000	78·00	$74.00/M
5,000	69·50	69.00/M
10,000	66·50	66.00/M
25,000	63·50	64.00/M
50,000	62·50	63.00/M
100,000 up	Annual contract quoted on request	

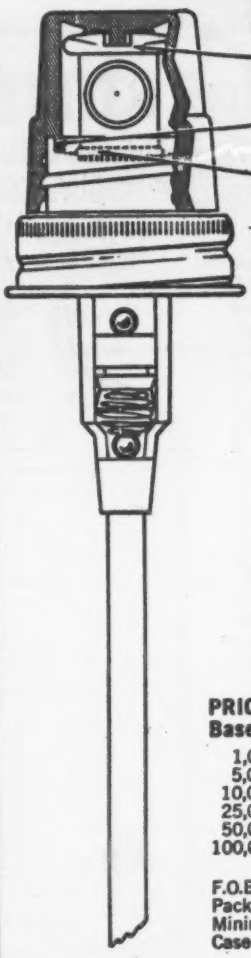
F.O.B. Kansas City, Missouri
Pack: 1,000 Sprayers to case
Minimum Order: 1,000 Sprayers
Case Weight: 28 lbs.

CAPS

The Model 1 Sprayer can be equipped with any size cap, 20mm to 33mm, metal or molded. Bakan can furnish caps in most sizes from inventory (price list furnished on request).

Caps that are not available with the hole molded or punched in have to be punched or bored. Bakan is equipped to punch or bore caps at $3.50/M.

MODEL 3



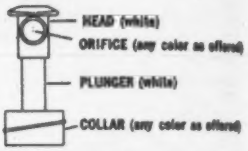
EXCLUSIVE TRIPLE-SEAL FOR LEAK-PROOF PERFORMANCE

1. Diaphragm is depressed by cap extension, sealing orifice.
2. Cover cap seals against rib of collar.
3. Bottom of head forms an "O" ring type seal.

COMPLETELY ASSEMBLED "IN THE BOTTLE" SPRAYER

Enables manufacturer to ship and merchandise his product with a sprayer in the container. Ready to use.

COLORS



All white or white plunger and head with red, blue, green or yellow orifice and collar available from stock.
Note: Head is produced from natural polyethylene only.

PRICES—

Base Sprayer Without Cap

1,000	$85.00/M
5,000	78.00/M
10,000	76.00/M
25,000	74.00/M
50,000	73.00/M
100,000 Up	Annual contract quoted on request

F.O.B. Kansas City, Missouri
Pack: 1,000 Sprayers to Case
Minimum Order: 1,000 Sprayers
Case Weight: 34 lbs.

CAPS

The Model 3 Sprayer can be equipped with any size cap, 24mm to 33mm, metal or molded. Bakan can furnish caps in most sizes from inventory (price list furnished on request).

Caps that are not available with the hole molded or punched in have to be punched or bored. Bakan is equipped to punch or bore caps at $3.50/M.

LINER REMOVAL
Caps can not be punched or bored with liners. Bakan will remove liners at $2.50/M.

DIP TUBES—MODEL 1 OR 3
Semi-rigid dip tubes will be cut any desired length, up to 9¾" at no additional cost. Flexible Dip Tubes are available at an additional cost of $5.00/M. Measure from top of container to inside bottom of bottle and subtract ⅛ inch.

SPRING—MODEL 1 OR 3
The sprayer is equipped with a stainless steel spring.

VALVE BALLS
The Model 1 or 3 Sprayer is equipped with nickel plated balls.

Stainless steel balls are available at $8.00/M Sprayers; Pyrex Glass Balls at $2.00/M Sprayers.

HEAT RESISTANT
The pump assembly is molded of acrylonitrile styrene copolymer (Tyril) capable of resisting up to 190°F. without distortion.

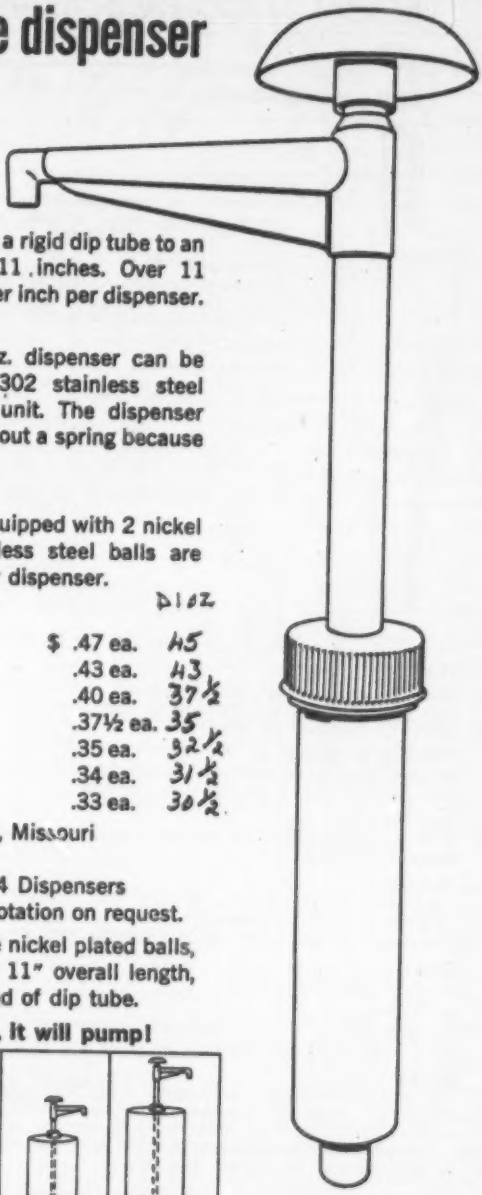
COMPATIBILITY
The plastic components of Bakan's Model 1 and 3 Sprayers are compatible with most chemicals where sprayers are commonly used. It is suggested, however, that thorough tests be made by the buyer and Bakan's laboratory to make sure the sprayer is compatible with the buyer's product.

435

BAKAN MARK 30 1 OZ. DISPENSER

At Last a 1 oz. or ½ oz.* per stroke dispenser

The MARK 30 DISPENSER is precision molded of new durable tough plastic called Cycolac which will withstand temperatures up to 160° F.



SPECIAL HEAD

Unbreakable . . . designed to fit the palm of the hand for rapid action.

REINFORCED 3" SPOUT

Reduces breakage. Spout designed to dispense straight down . . . easier to dispense.

COLORS

Dispenser is furnished from stock in all white. Special colors: tan, red, green and yellow available in quantities of 5,000 or more at .005 per unit.

VOLUME PER STROKE

1. The MARK 30 without a spring will deliver an average of 29 cc's per stroke and is easy to dispense.
2. Equipped with a spring the MARK 30 will deliver an average of 24 cc's per stroke.
3. Equipped with a short stroke plunger, with or without a spring, the MARK 30 will deliver 15 cc's per stroke.

CAPS

The dispenser can be equipped with any size or type metal, molded or polyethylene cap, 38mm or larger. Bakan can furnish caps in most sizes from inventory (price list furnished on request).

PUNCHING OR BORING

All caps must be punched or bored to fit the MARK 30. Cost: .0035 per cap. For liner removal add .0025 per unit.

DIP TUBES

Will be cut to customer's specification.

Base price includes a rigid dip tube to an overall length of 11 inches. Over 11 inches add .0015 per inch per dispenser.

SPRINGS

The 1 oz. or ½ oz. dispenser can be equipped with a 302 stainless steel spring at .04 per unit. The dispenser operates easily without a spring because of the large head.

VALVE BALLS

The dispenser is equipped with 2 nickel plated balls. Stainless steel balls are available at .01 per dispenser.

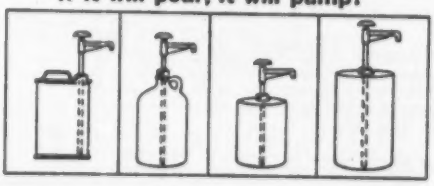
PRICES

		Doz
144	$ .47 ea.	45
500	.43 ea.	43
1,000	.40 ea.	37½
2,000	.37½ ea.	35
5,000	.35 ea.	32½
10,000	.34 ea.	31½
25,000	.33 ea.	30½

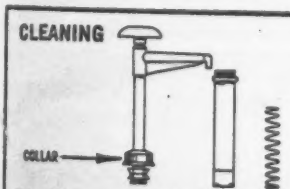
F.O.B. Kansas City, Missouri
Pack: Bulk
Minimum Order: 144 Dispensers
Special Packing: Quotation on request.

Above prices include nickel plated balls, rigid dip tube up to 11" overall length, 401 can base instead of dip tube.

If it will pour, it will pump!



CLEANING



The dispenser can be taken apart by unscrewing the collar above the cap and washing and re-assembling. The dispenser has been designed with caged valve balls so that they can not be lost.

*** SHORT STROKE PLUNGER**



The MARK 30 Dispenser can be furnished with a short stroke plunger which will deliver ½ oz. per stroke with or without a spring. Cost: .01 per unit additional.

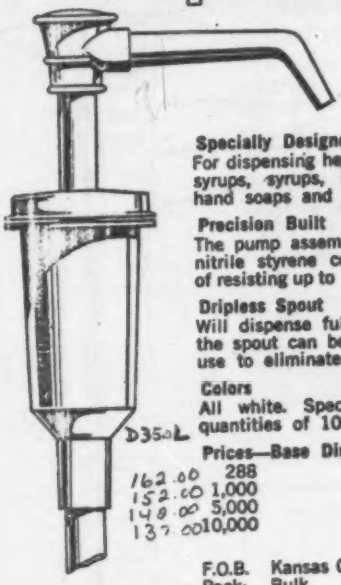
401 CAN BASE



The MARK 30 can be equipped with a plastic foot base so that it will fit a 401 can. The base foot furnished at no additional cost.

BAKAN DISPENSERS

Model 7 CC Dispenser



Specially Designed
For dispensing heavy liquids such as malt syrups, syrups, hand lotions, waterless hand soaps and chemicals.

Precision Built
The pump assembly is molded of acrylonitrile styrene copolymer (Tyril) capable of resisting up to 190°F. without distortion.

Dripless Spout
Will dispense full 7 cc's per stroke and the spout can be turned up when not in use to eliminate dripping.

Colors
All white. Special colors available on quantities of 100,000 or more.

Prices—Base Dispenser without Cap

288	$165.00/M
1,000	155.00/M
5,000	145.00/M
10,000	135.00/M

F.O.B. Kansas City, Missouri
Pack: Bulk
Minimum Order: 288 Dispensers

CAPS
The 7 CC Dispenser can be equipped with any size cap, 38mm or larger. Bakan can furnish caps in most sizes from inventory (price list furnished on request).

Punching or Boring
All caps must be punched or bored to fit the 7 CC Dispenser. Bakan will punch or bore caps at $3.50/M.

Liner Removal
Caps can not be punched or bored with liners. Bakan will remove liners at $2.50/M.

Dip Tubes
Dip Tubes will be cut to fit standard jars, jugs and cans. Our price includes a rigid tube, up to an overall length of 8 inches. Over 8 inches, add $1.50 per inch per thousand dispensers.

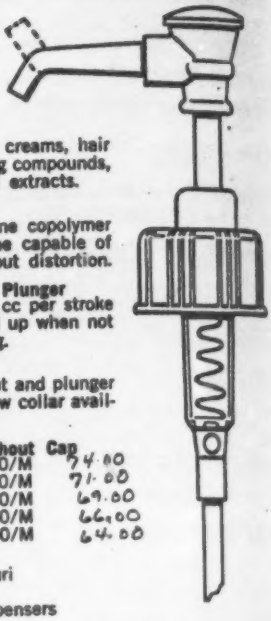
Spring
Stainless steel 302 spring.

Valve Balls
Nickel plated steel balls. Stainless steel 302 balls are available at an extra $9.50 per thousand dispensers.

Compatibility
The plastic components of Bakan's 7 CC Dispenser are compatible with most liquids where dispensers are commonly used. It is suggested, however, that thorough tests be made by the buyer and Bakan's laboratory to make sure the dispenser is compatible with the buyer's product.

Note: When ordering be sure to specify model number, color, cap size, style and color and dip tube length and if desired, flexible dip tubes, stainless steel or pyrex glass balls.

Model 10 Lotion Dispenser



Specially Styled
For dispensing lotions, hand creams, hair dressings, detergents, cleaning compounds, liquid waxes, salad oils and extracts.

Precision Built
Molded of acrylonitrile styrene copolymer (Tyril) and linear polyethylene capable of resisting up to 190°F. without distortion.

Dripless Spout—Full Stroke Plunger
Will deliver approximately 1 cc per stroke and the spout can be turned up when not in use to eliminate dripping.

Colors
All white or white head, spout and plunger with red, blue, green or yellow collar available.

Prices—Base Dispenser without Cap

1,000	$77.00/M
5,000	72.00/M
10,000	69.00/M
25,000	67.00/M
50,000	66.00/M

F.O.B. Kansas City, Missouri
Pack: Bulk
Minimum Order: 1,000 Dispensers

Caps
The Model 10 may be equipped with any size or style cap, 20mm to 33mm, metal or molded. Bakan can furnish caps in most sizes from inventory (price list furnished on request).

Punching or Boring
Caps that are not available with the hole molded or punched in have to be punched or bored. Bakan is equipped to punch or bore caps at $3.50/M.

Liner Removal
Caps can not be punched or bored with liners. Bakan will remove them at $2.50/M.

Dip Tubes
Semi-rigid dip tubes will be cut to any desired length up to 9¾" at no additional cost. Flexible dip tubes are available at $5.00/M additional.

Spring
Stainless steel 302 spring.

Valve Balls
Nickel plated steel balls. 302 stainless steel balls are available at an additional $8.00/M dispensers. Pyrex glass balls are available at an additional $2.00/M dispensers.

Compatibility
The plastic components of Bakan's Model 10 Lotion Pump are compatible with most liquids where dispensers are commonly used. It is suggested, however, that thorough tests be made by the buyer and Bakan's laboratory to make sure the dispenser is compatible with the buyer's product.

BAKAN PLASTICS
DIVISION OF COOK CHEMICAL COMPANY
BOX 78 • 2500 Summit
Kansas City 41, Missouri

DISTRIBUTED BY:

437

CAP PRICES

Effective November 2, 1961

MM Size	Finish	Quantity Prices Per Thousand			
		Color	Metal	Black Phenolic	White Urea
20	400	W	$2.42* **	$4.73*	$6.53*
22	400	W	2.57* **	5.18*	7.68
2[illegible]	400	W	2.82* **	5.71* **	8.28* **
26	400	W B	2.92* **		
28	400	W B Y	3.30* **	6.00* **	9.22* **
30	Beta	B R	3.99* **		
30	400			7.98	11.29
33	400	W	3.67* **	8.80*	12.08
38	400	W	4.13*	11.31*	15.19
43	400	W	5.10		
48	400	W	5.58*		
53	400	W	6.89*		
58	400	W	7.17		
63	400	W	8.75		
70	400	W	10.22		
83	400	W	14.91*		
89	400	W	17.13		
120	400	W	25.94		
G450	---	W	10.72*		
20	410			5.50*	7.36*
22	410			6.28	8.49*
24	410			7.34*	9.57*
28	410			9.35	13.17
20	415			6.62	8.85
22	415			8.52	12.53*
24	415			10.05	15.54
24	430			8.01	11.50
28	430			9.53	13.68
38	430			20.73*	29.92
60	440	W	7.85		
100	440	W	21.03		
1"	Tin		2.64* **		
1 1/4"	Tin		5.34*		
1 3/4"	Tin		9.23*		

SPECIAL

26	P103	6.44 - High Impact Styrene
28	P100	6.33 - High Impact Styrene
3/4"	H.D.	11.67* ** - Styrene

POLYETHYLENE

401	Snap Tite	41.80
404	Snap Tite	44.00
#10	Snap Tite	74.25
38	Nat. Buttress	55.65
38	400	23.49

Colors: W - White, B - Blue, Y - Yellow, R - Red

* - In Stock

** - Caps with holes Note: Add $3.50/M for punching or boring caps without holes.

PRICES SUBJECT TO CHANGE WITHOUT NOTICE

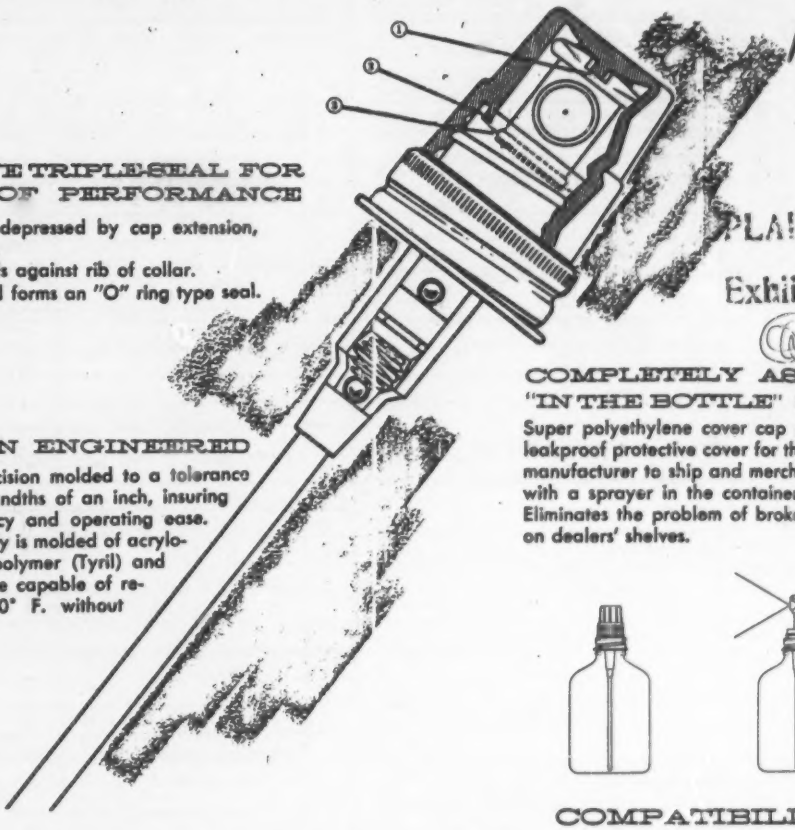
Other Sizes and Colors Quotes on Request.

438 Reco 10/17

BAKAN
PLASTIC SPRAYERS & DISPENSERS

Model 3
TRIPLE-SEAL
LEAKPROOF SPRAYER

P's GG



PLAINTIFF'S Exhibit GG 3/16/

EXCLUSIVE TRIPLE-SEAL FOR LEAKPROOF PERFORMANCE

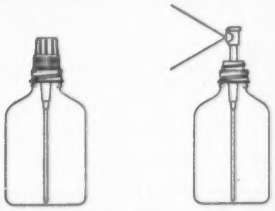
1. Diaphragm is depressed by cap extension, sealing orifice.
2. Cover cap seals against rib of collar.
3. Bottom of head forms an "O" ring type seal.

PRECISION ENGINEERED

All parts are precision molded to a tolerance of two one-thousandths of an inch, insuring maximum efficiency and operating ease. The pump assembly is molded of acrylonitrile styrene copolymer (Tyril) and linear polyethylene capable of resisting up to 190° F. without distortion.

COMPLETELY ASSEMBLED "IN THE BOTTLE" SPRAYER

Super polyethylene cover cap provides a sealed, leakproof protective cover for the sprayer. Enables manufacturer to ship and merchandise his product with a sprayer in the container. READY TO USE. Eliminates the problem of broken or lost sprayers on dealers' shelves.



COMPATIBILITY

The plastic components of the BAKAN Model 3 Triple-Seal Leakproof Sprayer are compatible with most chemicals where sprayers are commonly used. It is suggested, however, that each product be thoroughly tested with the sprayer to make sure they are compatible.

Model 3 Triple-Seal Leakproof Sprayers, identified as "Sprayers with Protective Caps," are patented under U.S. Letters Patent No. 2,870,943, and other patents pending.

distributed by:

BAKAN PLASTICS

DIVISION OF COOK CHEMICAL COMPANY

P.O. BOX 78 ● 2500 SUMMIT ● KANSAS CITY 41, [illegible]

439

Model 3 BAKAN SPRAYER

TRIPLE-SEAL LEAKPROOF

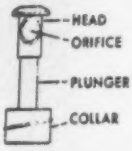
PRICE

QUANTITY	PRICE PER THOUSAND
1,000	$88.00 per thousand
5,000	81.00 per thousand
10,000	79.00 per thousand
25,000	77.00 per thousand
50,000	76.00 per thousand
100,000 and up	Annual contract quoted on request

TERMS

F.O.B. Kansas City, Missouri
MINIMUM ORDER: 1,000 sprayers to case
CASE WEIGHT: 34 lbs.

COLORS



All white or white plunger and head with red, blue, green, or yellow orifice and collar. Be sure to specify color when ordering. NOTE: Head comes in WHITE only.

CAPS:

Available in stock in following sizes and colors:

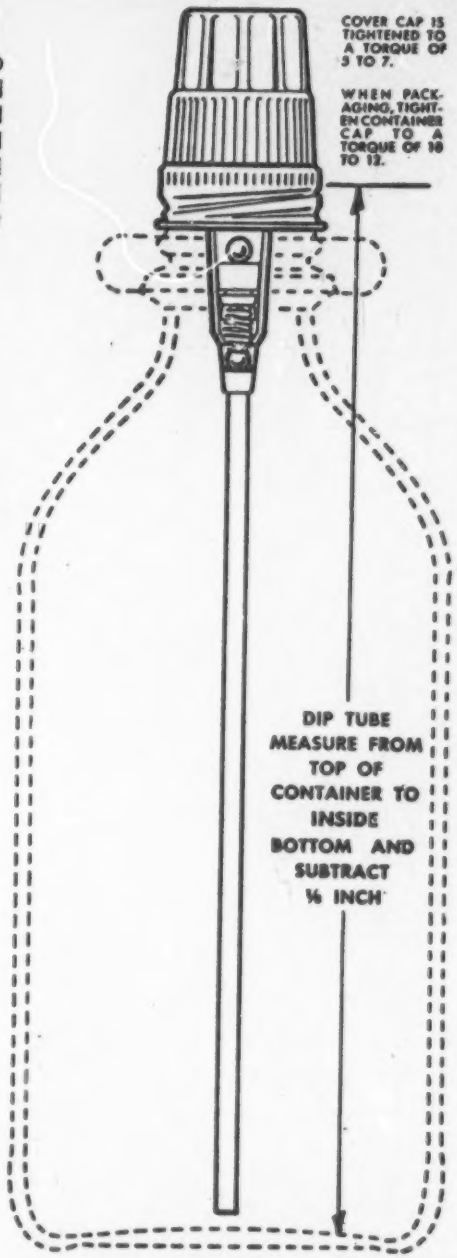
WHITE METAL—20, 22, 24, 26, 28, 33mm, 400 finish
BLUE METAL—26 & 28mm
YELLOW METAL—28mm
BLACK BAKELITE—24 & 28mm—$3.00/M extra
WHITE UREA—24 & 28mm—$6.00/M extra

BAKAN can furnish metal or molded caps in any color or size from 20mm to 38mm. Prices quoted on request. If customer furnishes caps, there will be a boring or punching charge of $2.50/M plus an additional $2.50/M for liner removal, if required.

DIP TUBES

SEMI-RIGID STANDARD DIP TUBES will be cut to any desired length at no additional cost. FLEXIBLE DIP TUBES are available at an additional cost of $5.00/M.

When ordering specify over-all length from top of container to desired depth. Please submit sample bottle or container to insure accuracy.

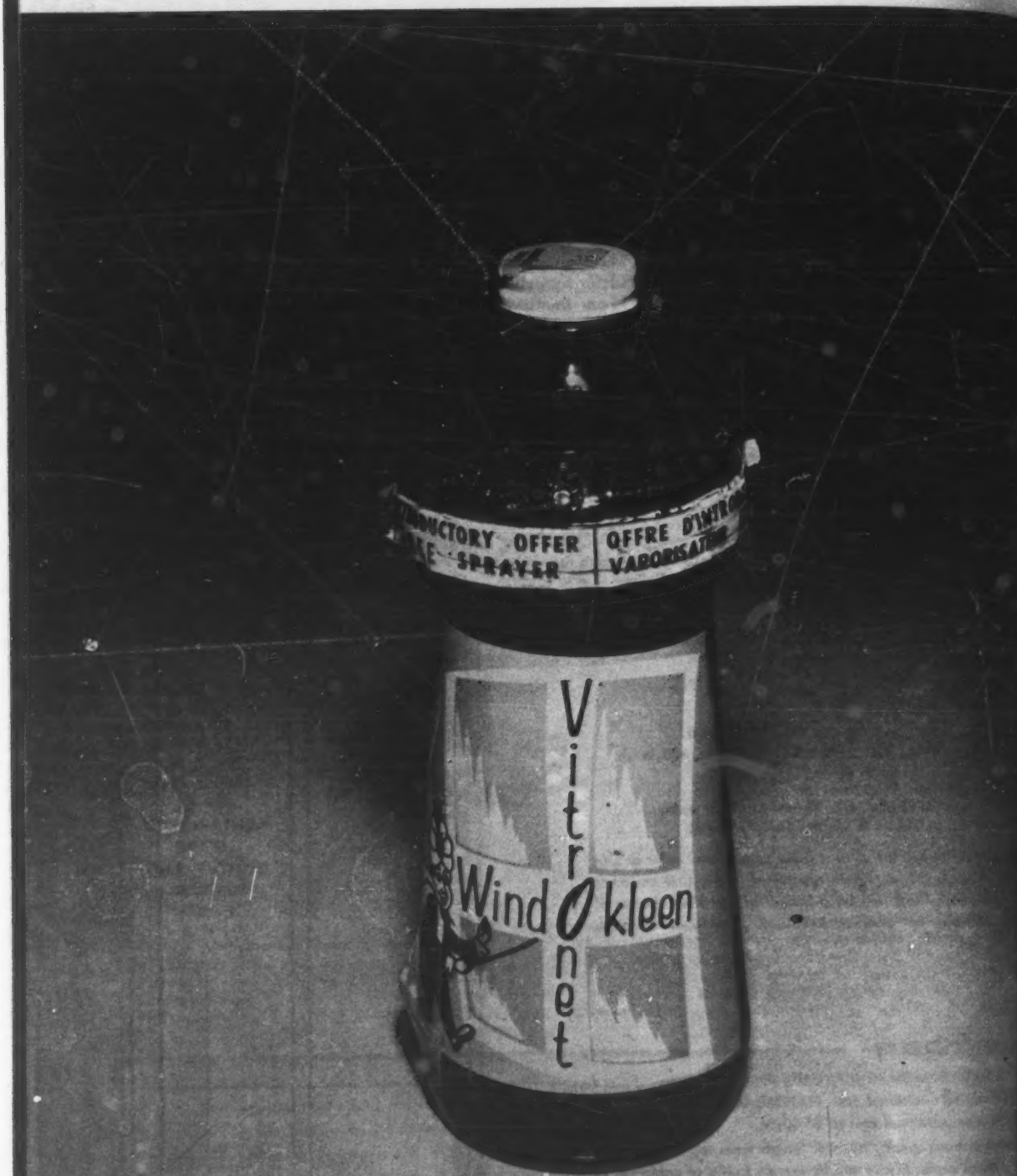


Ease of Aerosol at Low Cost

NOTE: When ordering be sure to specify (1) Model Number, (2) Cap Size and Color, (3) Sprayer Color, (4) Dip Tube Length. And, if desired, (1) Flexible Dip Tube.

PLAINTIFF'S EXHIBIT HH-1

440



HH 1

PLAINTIFF'S EXHIBIT HH-2

441



105

PLAINTIFF'S EXHIBIT HH-3

447

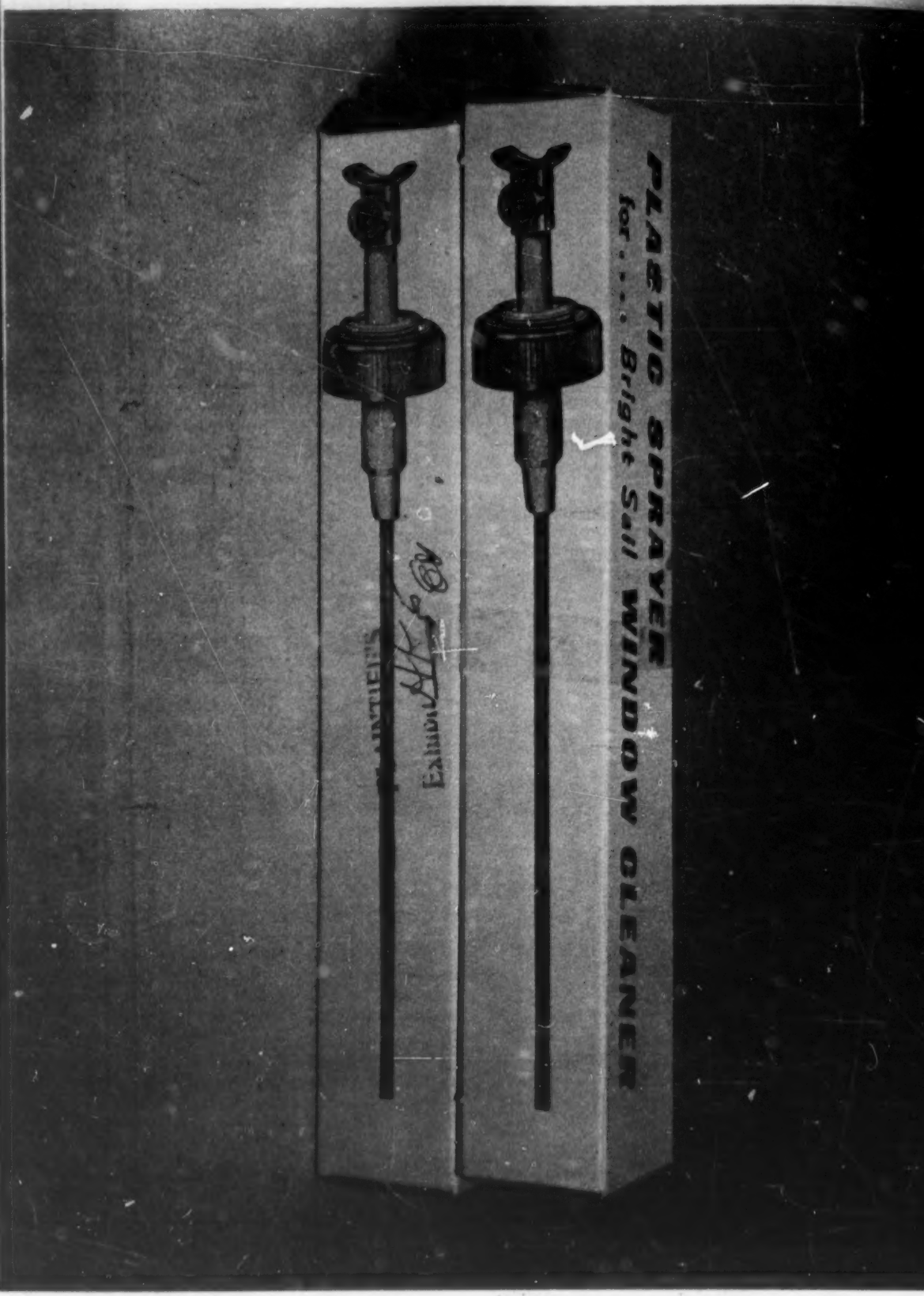


PLAINTIFF'S EXHIBIT HH-4

443

PLAINTIFF'S EXHIBIT HH-5a

444.



PLAINTIFF'S EXHIBIT HH-5b

443



PLAINTIFF'S EXHIBIT HH-6

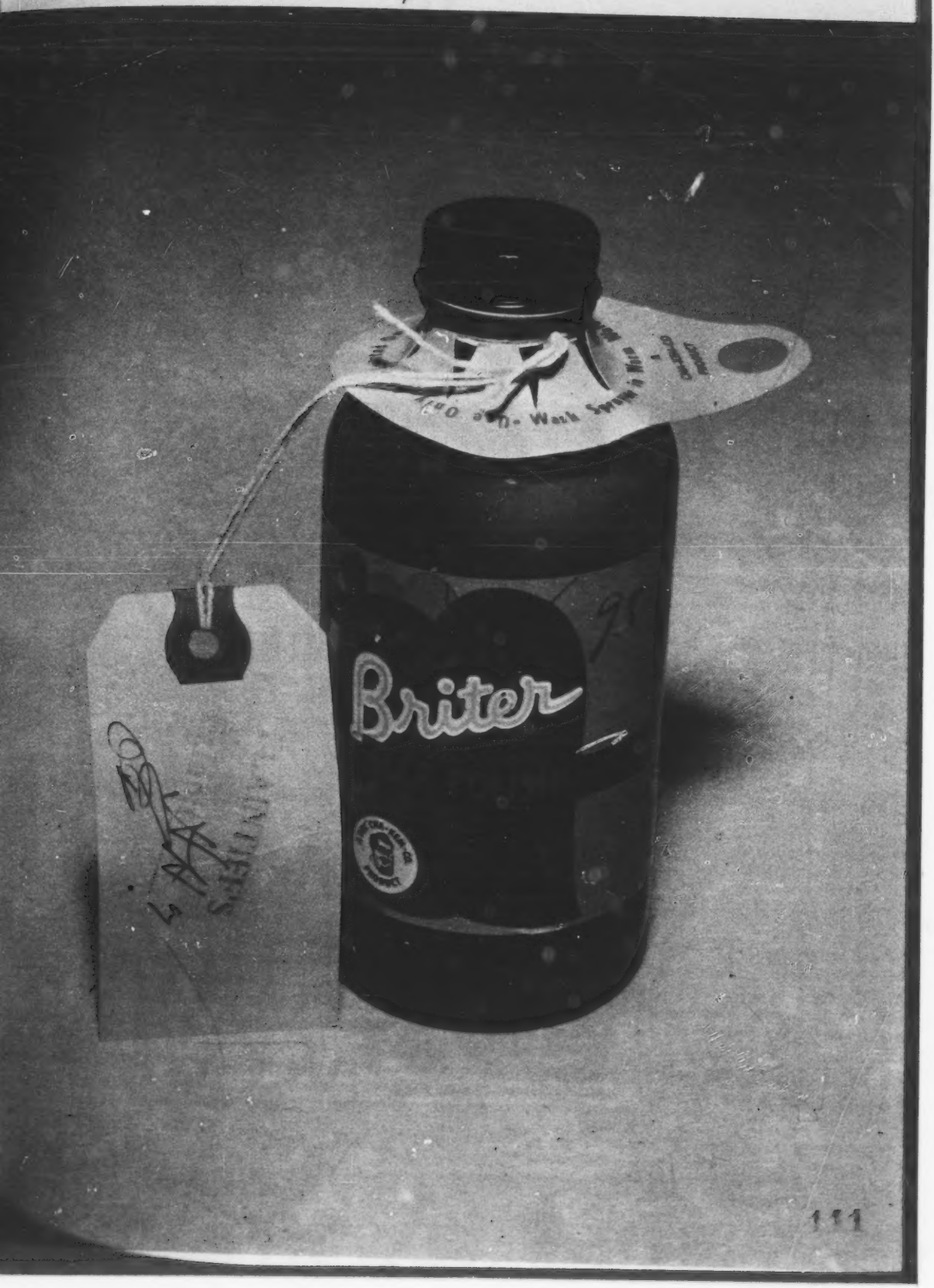
446



110

PLAINTIFF'S EXHIBIT HH-7

447



111

PLAINTIFF'S EXHIBIT HH-8

448



PLAINTIFF'S EXHIBIT HH-9

449



PLAINTIFF'S EXHIBIT HH-10

450



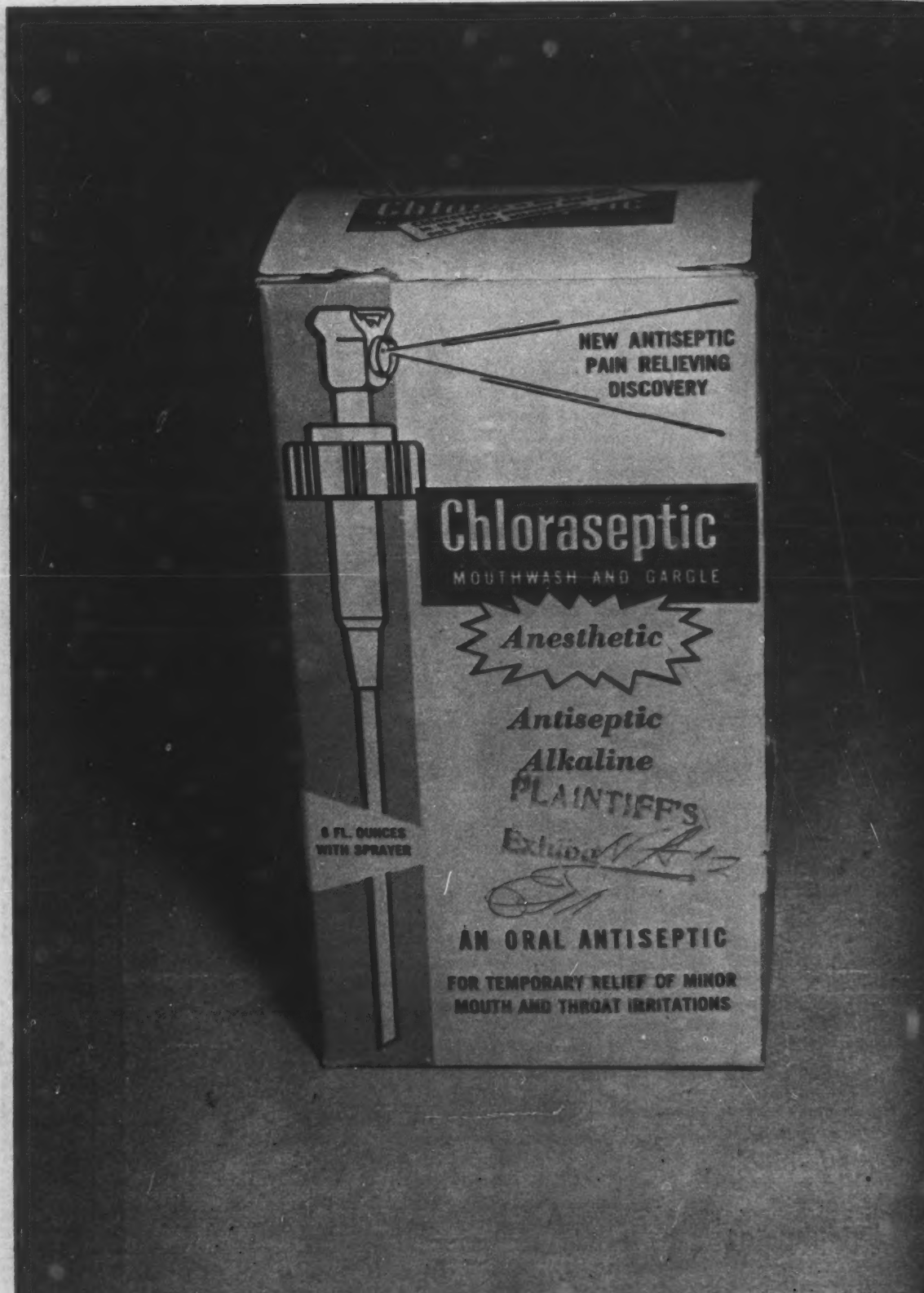
PLAINTIFF'S EXHIBIT HH-11

451



PLAINTIFF'S EXHIBIT HH-12

452



PLAINTIFF'S EXHIBIT HH-13

453



[1132] PLAINTIFF'S EXHIBIT II.

COLGATE-PALMOLIVE COMPANY'S SHIPMENTS TO ALL CUSTOMERS FOR THE YEAR 1958 OF ALL BOTTLED INSECTICIDE (SPRAYER ATTACHED TO BOTTLE BY CARDBOARD COLLAR)

16 ounce bottle	—	79,796 dozen (or cases)
32 ounce bottle	—	32,476 dozen (or cases)
		112,272 dozen

Colgate's 1958 Price Per Case For All Customers

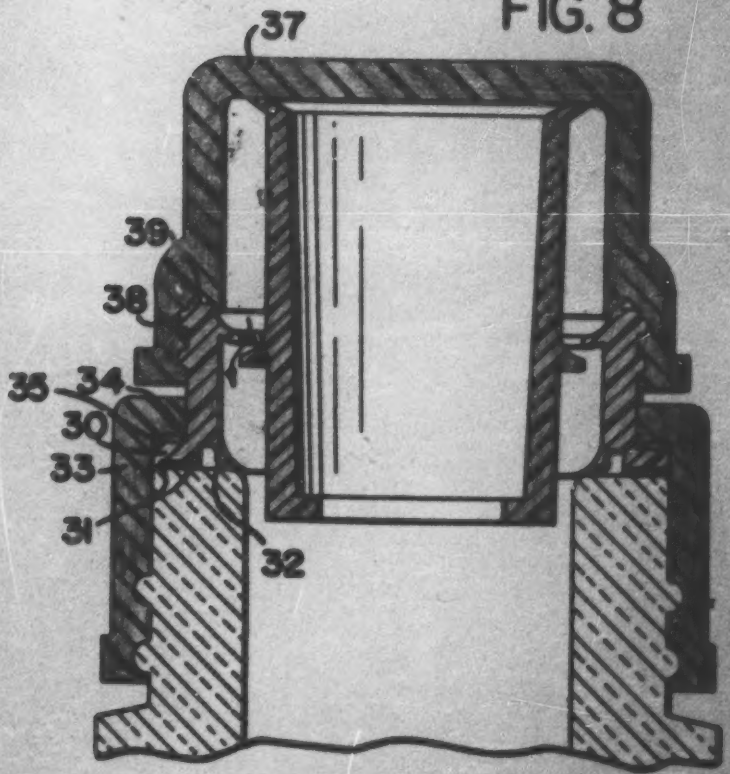
	16 oz bottle	32 oz bottle
Carload	$5.63	$9.70
50 Cases (or doz.)	5.68	9.80
10 cases (or doz.)	5.80	10.00
5 cases (or doz.)	5.85	10.05
16 oz 79,796 x $ 5.85 =	$466,806.60	
32 oz 32,476 x $10.05 =	326,383.80	
Total =	$793,190.40	

PLAINTIFF'S EXHIBIT JJ
455

JJ JJ

2715480

FIG. 8



INVENTOR.

JAY G. LIVINGSTONE

P-JJ

PLAINTIFF'S EXHIBIT KK
457

MELLON.

2586687

KK

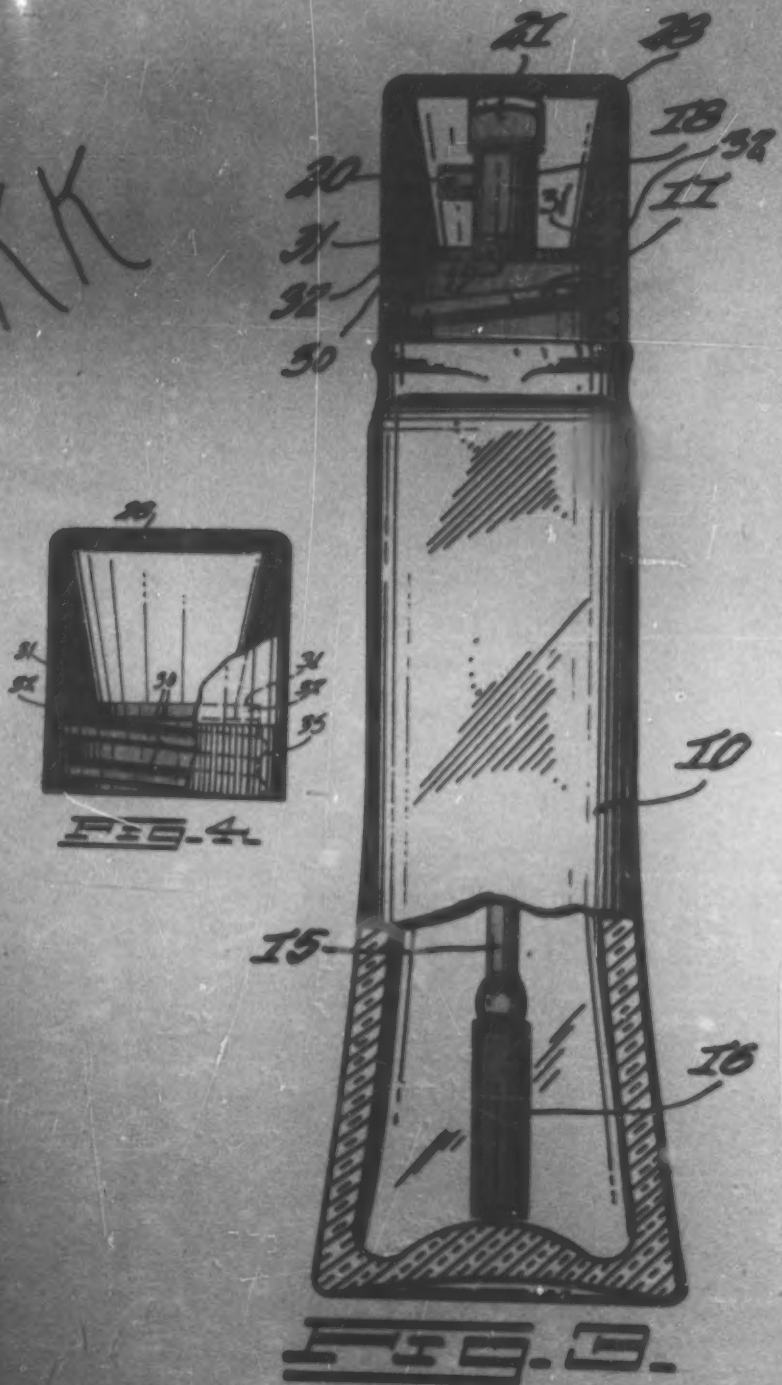


FIG. 3.

FIG. 4.

P-KK

45-8

PLAINTIFF'S EXHIBIT MM

459

July 22, 1958 W. J. SLADE 2,844,290

DETERGENT CAN

Filed July 27, 1955

FIG.1.

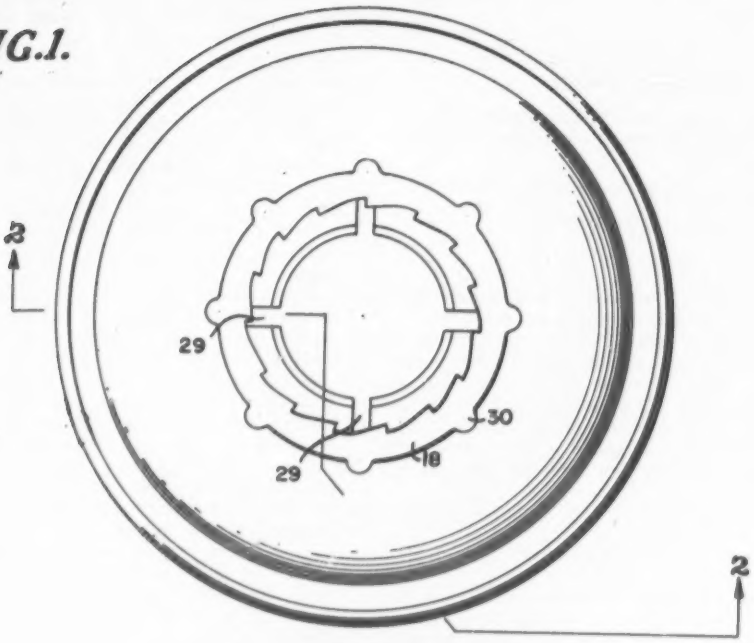
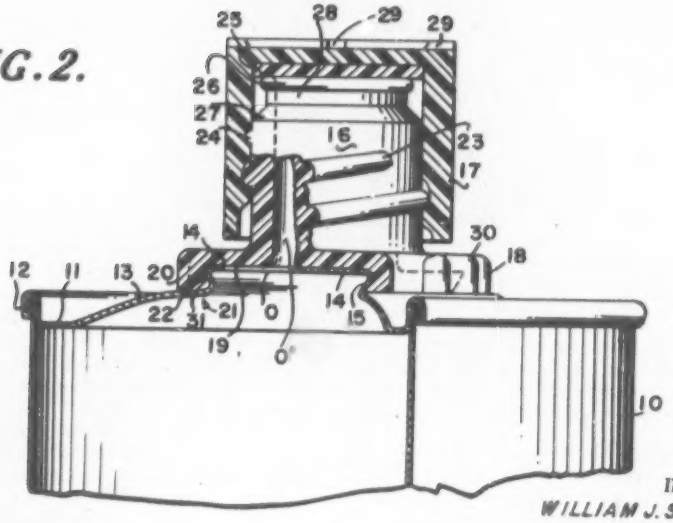


FIG.2.



INVENTOR
WILLIAM J. SLADE

BY Cushman, Darby & Cushman
ATTORNEYS

BEST COPY AVAILABLE

PUBLISHER'S NOTICE

Material on the following frames is
the best copy available to publisher.

460

United States Patent Office

2,844,290

Patented July 22, 1958

2,844,290

DETERGENT CAN

William J. Slade, Haddonfield, N. J., assignor to Crown Cork & Seal Company, Inc., Philadelphia, Pa., a corporation of New York

Application July 27, 1955, Serial No. 524,787

2 Claims. (Cl. 222—562)

This invention relates to containers such as metal cans useful particularly for detergent liquids and powders.

The container has its ends normally closed and one of the ends is formed with means for securely receiving a plastic pouring spout. The latter, in turn, may be threaded or otherwise provided with a cap-receiving finish to thereby receive and retain a reseal closure. Thus, the can may be effectively sealed at all times, both prior to initial opening and thereafter until the contents are used up.

Referring to the drawings:

Figure 1 is a top view, and

Figure 2 is a section on line 2—2 of Figure 1 with the container body broken away.

In the drawing, 10 indicates a conventional cylindrical metal container body having, at its top and bottom, customary metal ends 11 seamed to the body in the usual manner, as shown at 12.

The top end 11 is dome-shaped, i. e., centrally convex, as shown at 13, and the dome terminates upwardly in a continuous closed flat portion 14 having an inwardly extending shoulder 15. The flat portion 14 may be scored to aid forming the opening O.

In use, after this flat portion 14 has been severed to form an opening O of any desired size, a neck-pouring spout 16 with cap 17 is attached to the end 11 to continue the seal, as the contents are used up.

This neck-pouring spout is made of plastic such as polyethylene, and has an integral, circular base or flange 18 of greater diameter than the upstanding, cylindrical neck 16, as shown. The undersurface of the flange 18 is flat, as shown at 19, to correspond with and engage the flat surface of the portion 14 of the end. The circular skirt 20 of the flange has its inner wall 21 undercut to form an inwardly extending groove 22. This circular groove 22 will receive, in resilient, frictional, sealing fit, the circular pouring spout-receiving shoulder 15, as shown.

The neck-pouring spout 16 is shown as having a threaded cap-receiving finish 23 to receive a usual threaded reseal cap 17 of plastic, such as polyethylene, or metal, as desired. The cap is provided with the usual sealing liner 25 on its inside engaging the integral, outwardly extending, rounded bead 26 of the pouring spout. The neck above the threaded area is inclined inwardly at 27 and extends upwardly as the cylindrical portion of reduced diameter 28 terminating in the outwardly projecting, rounded bead 26. The top of the plastic closure 17 has diametrically intersecting grooves 29 for receiving a tool to turn the cap to open or closed position for convenience, and, if desired, the flange 18 is suitably knurled or provided with spaced hand-gripping projections 30 to assist in applying the pouring spout to the container and locking the same thereto, as above-described.

The container may be provided initially with the opening O and the pouring spout 16 and cap 17 in position as shown. Also, the top 14 may be scored so that the opening may be easily formed. The container may be made of plastic, such as polyethylene, and, as stated, the pouring spout and closure may be of metal or plastic.

While I have mentioned polyethylene as the preferred plastic, other suitable plastics may be used.

While the threaded finish 23 is preferred, other conventional closure-receiving finishes may be used, e. g., to receive lug caps, crowns and pressed-on caps, the closure 17 being shown with cap-receiving threads 24 to engage the threaded finish 23 for purposes of illustration.

The container structure above-described provides a continuous and reliable pouring spout and reseal for liquids, pastes and granular products which are customarily packed in metal or plastic containers.

It will be observed that the container 10 has the end 11 provided with the projection defined by the flat surface 14 and the integral shoulder 15, the latter extending inwardly and downwardly therefrom, and that the pouring spout has a neck portion 16 provided with an internal opening O' which is enlarged adjacent the flange 18, and is of reduced diameter as it passes centrally through the neck or pouring spout 16. The flange portion, as stated, has the flat portion 21 engaging the flat surface 14 of the projection, and this flange also has the depending skirt 20 formed with an internal groove 22 for receiving in frictional, resilient, sealing relation the shoulder 15 of the projection on the end 11. Whether the flat surface 14 is provided initially closed or closed and provided with a scoring defining an opening O, or the opening O is already formed in the surface 14, the respective openings O and O' communicate when the pouring spout is in position, as shown. As will be appreciated, the container can be supplied independently of the pouring spout, i. e., the spout may be attached to the container, either before or after an opening O is formed in the flat surface 14. That is, the pouring spout is detachably secured to the end 11 and, of course, where the opening O is initially formed in the surface 14, the pouring spout and its closure will form a part of the container package before or after the same has been filled.

Referring to Figure 2, it will be observed that not only does the shoulder 15 engage in the groove 22, but the flange being located at the base of the pouring spout, has the lower edge of its skirt 18 also engaging the adjacent curved top surface of the end, as shown at 31, to further assure, not only a rigid fit, but a tight seal as well.

It will be appreciated that the preferable construction consists of a metal container having a metal end with a plastic pouring spout, as illustrated.

I claim:

1. A cylindrical container having a metal end, a projection on said end having a flat surface and an integral shoulder extending inwardly and downwardly therefrom, a plastic pouring spout having a cylindrical neck portion provided with an opening and a flange portion located at the base of the pouring spout, said flange having a flat surface engaging the flat surface of the projection, a depending skirt on said pouring spout flange formed with an internal groove for receiving in frictional, resilient, sealing relation the said shoulder of the projection, the lower edge of said skirt of the flange also engaging the adjacent top surface of the end of the container, said container opening through its flat surface in said end into

the opening of the pouring spout, the pouring spout terminating in an upper, cylindrical, rounded bead portion of lesser diameter than said neck portion, and the outer wall of said pouring spout being adapted to receive a closure.

2. A container according to claim 1 having a closure thereon, said closure being in sealing relation with the rounded bead portion of said pouring spout.

References Cited in the file of this patent

UNITED STATES PATENTS

1,500,791	Bakken	July 8, 1924
1,653,284	Hothersall	Dec. 20, 1927
2,249,832	Hubschman	July 22, 1941
2,660,355	Allen	Nov. 24, 1953

PLAINTIFF'S EXHIBIT NN

462

May 24, 1938. O. G. NILSON 2,118,222

COMBINED CAP AND SPOUT FOR LIQUID DISPENSING CONTAINERS

Filed Feb. 17, 1936 2 Sheets-Sheet 1

Fig. 1

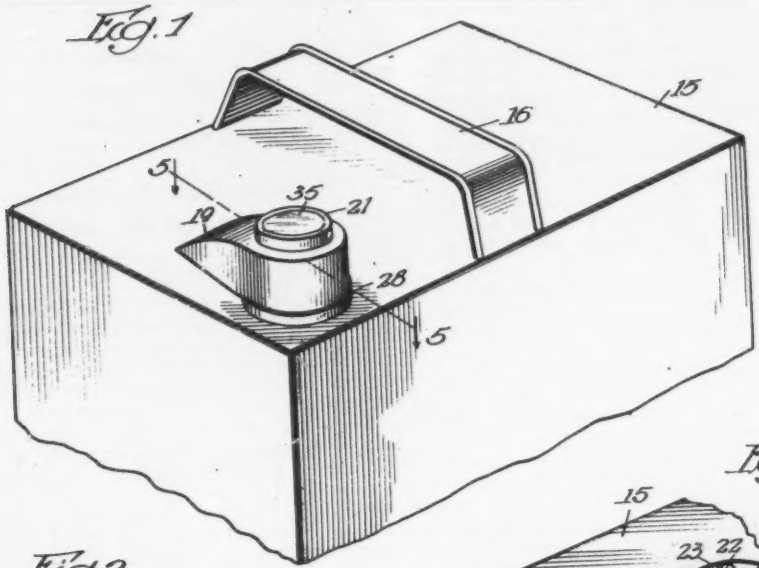


Fig. 3

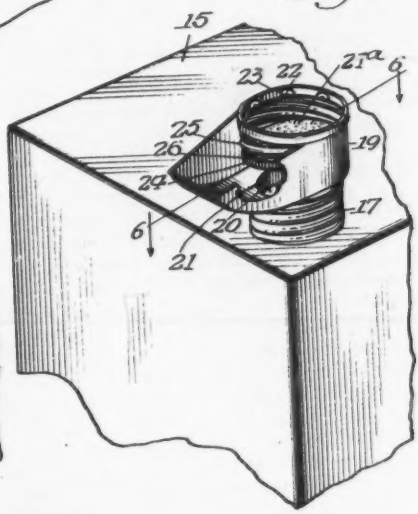


Fig. 2

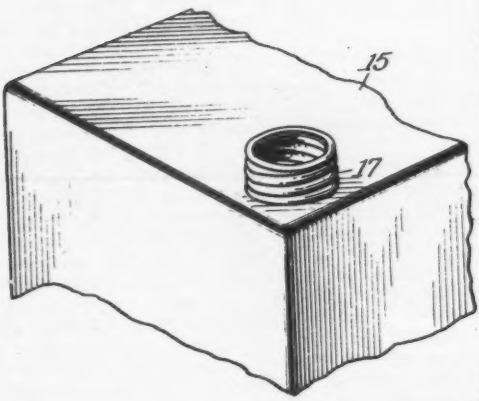


Fig. 4



Inventor
Olof G. Nilson
By [illegible]
Atty.

463

May 24, 1938. O. G. NILSON 2,118,222

COMBINED CAP AND SPOUT FOR LIQUID DISPENSING CONTAINERS

Filed Feb. 17, 1936 2 Sheets-Sheet 2

Fig. 5

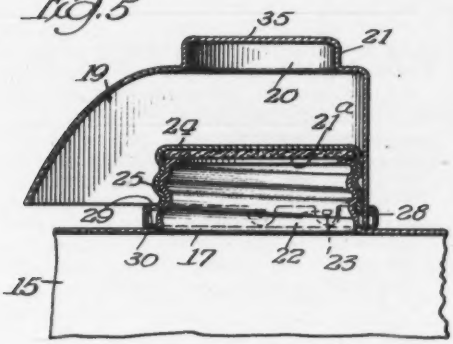


Fig. 6

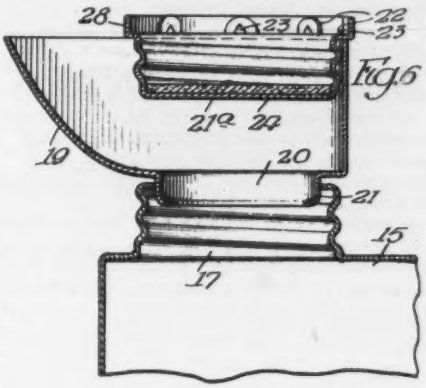


Fig. 8

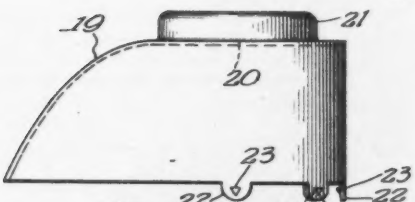


Fig. 9

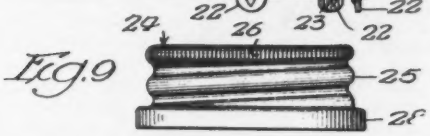


Fig. 7

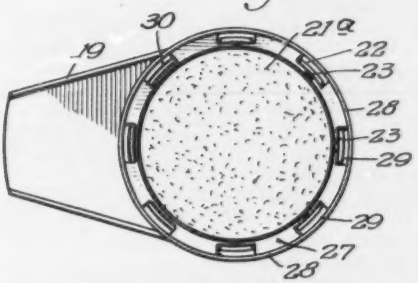


Fig. 10

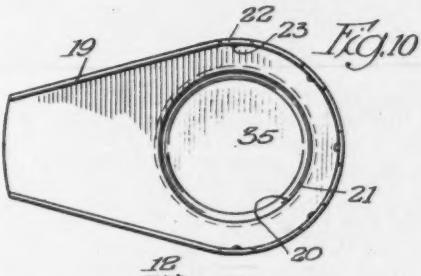


Fig. 11

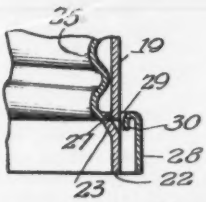


Fig. 12

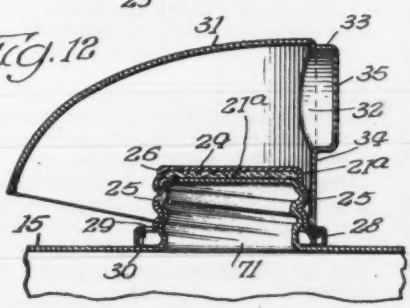
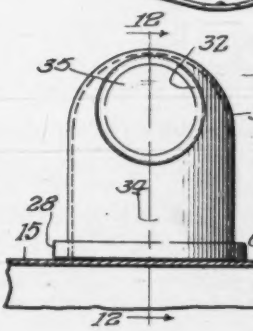


Fig. 13



Inventor
Olof G. Nilson
By Schumacher & Atty

Patented May 24, 1938

2,118,222

464

UNITED STATES PATENT OFFICE

2,118,222

COMBINED CAP AND SPOUT FOR LIQUID DISPENSING CONTAINERS

Olof G. Nilson, Chicago, Ill.

Application February 17, 1936, Serial No. 64,323

11 Claims. (Cl. 221—23)

This invention relates to improvements in combined cap and spout for liquid dispensing containers, and one of the objects of the invention is to provide an improved device of this character which may be readily converted from one use to the other, and which will be of a simple, durable, rigid and compact construction and effective and efficient in operation.

A further object is to provide an improved device of this character having the parts so arranged, that when the same is applied in one position to the nozzle of a dispensing container for sealing the same against delivery of liquid therefrom, the spout will at all times be disposed within the confines or within the plane of the periphery of the container, thereby insuring that the spout will be protected, and furthermore there will be no projecting spout, with the result that the containers may be closely packed for shipment or storage purposes.

A further object is to provide an improved device of this character in which the spout which is connected with the sealing cap will serve as a means for assisting in unscrewing or removing the cap.

A further object is to provide an improved device of this character in which the cap and the spout are separately constructed and may be separately packed for shipment, thus rendering it possible that the cap may be applied to the nozzle and completely seated to close the same, before the spout is attached, after which the spout may be attached to the cap at any desired position with respect thereto, so that the spout will be entirely disposed within the confines of the container walls, the two being independently secured together without the use of solder, brazing or welding.

A further object is to provide an improved device of this character having the parts so arranged and constructed that neither one will interfere with the operation of the other.

A further object is to provide an improved combined cap and spout which may be separately manufactured, and then connected together in assembled relation, the connecting means between the two being of such a nature and construction as will enable the user to cause the nozzle to assume any predetermined relation or position with respect to the cap, regardless of whether the cap is attached to the dispensing container nozzle, or not.

A further object is to provide improved means in a device of this character whereby the position of the spout can be predetermined and the operator will be assured that when the cap is seated in a sealing position, the spout will always be disposed within a predetermined area with respect to the walls or periphery of the container.

A further object is to provide in a combined cap and spout, means for temporarily forming a closure for the inlet opening of the spout, while the cap is being employed for sealing the dispensing container nozzle.

To the attainment of these ends and the accomplishment of other new and useful objects as will appear, the invention consists in the features of novelty, in substantially the construction, combination and arrangement of the several parts hereinafter more fully described and claimed and shown in the accompanying drawings illustrating this invention, and in which

Figure 1 is a perspective view of a portion of a dispensing container having a combined cap and spout applied thereto, and constructed in accordance with the principles of this invention, and with the cap in a position to seal the nozzle.

Figure 2 is a detail perspective view of a portion of the container showing the outlet nozzle.

Figure 3 is a detail perspective view of a portion of the container showing the combined cap and spout, with a portion of the spout broken away, as applied to the outlet nozzle in position to deliver liquid from the container.

Figure 4 is a detail perspective view, partially broken away, of the combined cap and spout.

Figure 5 is a detail sectional view, on an enlarged scale, as taken on line 5—5, Figure 1.

Figure 6 is a detail sectional view, on an enlarged scale, as taken on line 6—6, Figure 3.

Figure 7 is a bottom plan view of the cap and spout.

Figure 8 is a side elevation of the spout detached from the cap.

Figure 9 is an elevation of the cap.

Figure 10 is a bottom plan view of Figure 8.

Figure 11 is a detail, vertical sectional view of a portion of the nozzle and spout and showing the manner of securing the two together.

Figure 12 is a vertical sectional view taken on line 12—12, Figure 13, of another form of the invention.

Figure 13 is a left hand end elevation of Figure 12.

Referring more particularly to the drawings, the numeral 15 designates an ordinary dispensing container provided with a handle 16 and having a discharge outlet nozzle 17, which latter is preferably provided with screw threads 18 in the ordinary and well known manner.

The numeral 19 designates a delivery spout of any desired size and configuration and is constructed of any suitable material, but is preferably of a channel formation.

In one wall of the spout there is provided an inlet opening 20 encompassed by an outwardly projecting flange 21 formed in any suitable manner and projecting from the end of the wall of the spout are lugs or projections 22, any number of which may be provided and which may be arranged in any suitable position. Each of the projections 22 is provided with a laterally projecting lug 23 formed in any suitable manner, preferably by striking up a portion of the material of the projection.

The numeral 24 designates a closure cap of any suitable configuration, but is preferably provided with a body portion having threads 25 and a knurled portion 26 to facilitate in the operation of the cap.

The cap is preferably provided at its base with a laterally projecting flange 27 surrounded by a depending skirt 28, and in the flange 27 apertures or openings 29 are provided. These openings are formed in any suitable manner, preferably by piercing the material and deflecting a portion thereof downwardly as at 30, to stand within the skirt 28, and this portion 30 serves as a means for assisting in locking the parts together.

In assembling the parts, the projections 22 are inserted into the respective openings 29 in the flange 28 of the cap 24, so that the upper edge of the lugs 23 will pass below the bottom of the flange 27, and by reason of the resiliency of the material from which the spout is formed, the lugs 23 will spring or assume positions under a portion of the flange 27 adjacent the openings 29. The deflected portion 30 of the cap also assists, by reason of its resilient nature, in positioning the lug 23 beneath the flange 27, thereby locking the cap and spout together.

The spout 19 may be of any desired depth so that the cap 24 will extend into the spout for any desired distance, but only sufficiently so as not to restrict to any great extent the interior of the spout 19.

In the form of the invention shown in Figures 5 and 6, the top of the cap 24 is arranged in alinement with the inlet opening 20 of the spout, and the opening 20 is preferably of a diameter substantially less than the diameter of the top of the cap 24.

If desired, and in order to insure a perfect sealing of the discharge nozzle 17 by the cap 24, a filling material 21a, such as cork or the like, may be arranged within the cap, as shown in Figure 5.

When the parts are thus locked together, the device may be used in the position shown in Figure 5, that is, so that the cap will form a closure for the discharge nozzle of the container, and in this instance the spout 19 will not interfere with the operation of the cap.

When, however, it is desired to dispense the contents of the container 15, the cap 24 may be removed, and the spout 19 will form a handle to assist in unscrewing or detaching the cap from the discharge nozzle.

The device is then inverted and the flange 21 may then be inserted into the discharge nozzle 17, as shown in Figure 6, so that the contents of the container may be poured out through the spout.

In this form of the invention the top of the cap 24 will serve as a baffle or deflector for the liquid from the container and will direct it through the spout.

When the device is used as a spout, sufficient air will be admitted into the container through the openings 29 in the cap and also through the spout to permit the liquid to flow out of the container and thereby obviate the necessity of perforating the wall of the container.

In the form of the invention shown in Figures 12 and 13, the spout 31 is provided with an inlet opening 32 having a flange 33 encompassing the same, but in this form of the invention the inlet opening 32 is disposed in one of the upright walls 34 of the spout, so that the longitudinal diameter of the spout 31 passing through the inlet opening 32 will intersect the longitudinal diameter of the cap 24. The opening 32 in this form of the invention being to one side of the cap 24, so that when the cap 24 is removed and the spout attached to the discharge nozzle 17 by means of the flange 33 telescoping thereinto, there will be a direct pour of the liquid from the container and through the nozzle.

With this invention it will be manifest that the spout and the cap may be manufactured separately and shipped in a knocked-down condition.

Furthermore, the user will always be assured that no portion of the spout will project beyond the sides of the container while the cap is in a sealing position.

This is rendered possible by reason of the fact that the spout may be connected to the cap in any predetermined position so as to occupy a space within a predetermined area with respect to the periphery of the container.

One way of accomplishing this result is to first apply the cap 24 to the discharge nozzle and completely seat the same.

The spout may then be secured to the cap by positioning the spout in any desired relation with respect to the cap, then inserting the projections 22 of the spout in the predetermined openings 29 of the cap. When the spout is then pressed downwardly with respect to the cap, the lugs or projections 23 on the spout 19 will pass or spring beneath the edge of the flange 27 adjacent the respective openings 29 in the flange 27 of the cap.

Obviously, the spout 19 may be rotated on a vertical axis until the desired position of the spout with respect to the cap 24 and the container 15 is obtained before the cap and spout are secured together.

It may be desired or advisable to provide a temporary closure for the inlet opening of the spout and in that event a closure 35 may be formed from a portion of the material of the spout, which is shaped to form the flange 21. If such temporary closure 35 is provided, it may be partially severed from the flange 21 so as to enable the operator to readily remove this closure when it is desired to use the spout for dispensing the contents of the container.

Obviously and if desired, a similar closure may be provided for the inlet opening of the spout shown in Figures 12 and 13.

It will also be manifest that with the form of the invention shown in Figures 5 and 6, the end of the cap 24 being in alinement with the inlet opening 20 of the spout, will overcome pulsations of the liquid when it is being poured out of the container and thereby cause the liquid to flow out in a steady or even stream.

The usual cause of pulsations in the liquid is

that air must replace the liquid poured from the container. This, however, is not gradual, as there is a certain amount of vacuum created in the container, and air is sucked in through the liquid, causing the liquid at that moment to spurt. In the present invention this force strikes the cap which projects into the spout, causing the liquid to take a right angle turn, thereby causing the liquid to flow without pulsation.

It will also be manifest that with the present invention, the nozzle of the container may be placed at the very edge of the container, thereby eliminating waste of the liquid, by insuring that practically all of the liquid may be dispensed, as practically all of the containers which require a pouring spout have flat tops.

While the preferred forms of the invention have been herein shown and described, it is to be understood that various changes may be made in the details of construction and in the combination and arrangement of the several parts, within the scope of the claims, without departing from the spirit of this invention.

What is claimed as new is:—

1. A combined closure cap and spout, threaded means for securing the cap, and friction means for securing the spout to the nozzle of a dispensing container, said cap nested with and encompassed by the spout, and means for selectively securing the spout to the cap after the cap is seated on the nozzle and with respect to the means by which the cap is secured to the nozzle, whereby when the cap is seated on the nozzle the spout will be disposed, in its inoperative position, within the plane of the periphery of the container.

2. In combination a closure cap, means for securing the cap to a nozzle of a dispensing container, a spout, means for securing said spout to said nozzle, and means for securing the cap and spout together in predetermined relative positions after the cap is seated on the nozzle, whereby when one is secured to the said nozzle, the other will be maintained in an inactive position, the top of said cap being spaced from but in alinement with the inlet opening of said spout and extending entirely thereacross.

3. In combination, a closure cap, means for securing the same to the discharge nozzle of a dispensing container, a spout, means for securing the spout to said nozzle when the said cap is detached therefrom, and means for securing the spout to the cap in nested relation, after the latter is seated with respect to the nozzle, whereby the projection of the spout may be positioned within the plane of the periphery of the body of the container while the cap is in a sealing position.

4. In combination, a closure cap, means for securing the same to the discharge nozzle of a dispensing container, a spout, means for securing the spout to said nozzle when the said cap is detached therefrom, and means for securing the spout to the cap in nested relation, after the latter is seated with respect to the nozzle, whereby the projection of the spout may be positioned within the plane of the periphery of the body of the container while the cap is in a sealing position, said cap and spout being positioned with respect to each other so that neither will interfere with the operation of the other, when in use for their respective designed purposes.

5. As a unitary structure, a closure cap for the nozzle of a dispensing container, a spout having an entrance opening and a discharge outlet, said entrance opening adapted to be secured to the nozzle, and means for securing the spout to the cap, the said means embodying a projecting portion on the spout, a laterally projecting shoulder on said portion, said projection and shoulder projecting through an opening in the cap, whereby said shoulder will engage under a wall of said opening.

6. As a unitary structure, a closure cap for the nozzle of a dispensing container, a spout having an entrance opening and a discharge outlet, said entrance opening adapted to be secured to the nozzle, means for securing the spout to the cap, the said means embodying a projecting portion on the spout, a laterally projecting shoulder on said portion, said projection and shoulder projecting through an opening in the cap, whereby said shoulder will engage under a wall of said opening, and means for assisting in positioning the said shoulder under said wall.

7. As a unitary structure a sealing cap for the nozzle of a dispensing container, a delivery spout of substantial channel formation, an entrance opening in one wall of the spout, a projecting flange encompassing said opening and adapted to be frictionally telescoped with said nozzle when the cap is detached from the nozzle, means securing the cap and nozzle together in nested relation and in such position that when either is rendered active the other will be rendered inactive, and a temporary closure for normally sealing the said entrance opening in the wall of said spout.

8. As a unitary structure a sealing cap for the nozzle of a dispensing container, a delivery spout of substantial channel formation, an entrance opening in one wall of the spout, a projecting flange encompassing said opening and adapted to be frictionally telescoped with said nozzle when the cap is detached from the nozzle, and means securing the cap and nozzle together in nested relation and in such position that when either is rendered active the other will be rendered inactive, a portion of the material from which said flange is formed being shaped to normally form a temporary closure for the said entrance opening of the spout.

9. In combination, a closure cap, means for securing the cap to the nozzle of a dispensing container, a spout normally separate from the cap, means for securing the spout to the nozzle, and means for securing the spout to the cap in any selected position with respect to the cap, and against separation with relation to the cap, after the cap has been secured to the said nozzle, and in such a position with relation to the cap, that when either the cap or spout is rendered active with respect to the nozzle, the other of them will not interfere with the actively positioned one.

10. In combination, a closure cap, means for securing the cap to the nozzle of a dispensing container, a spout normally separate from the cap, means for securing the spout to the nozzle, and means for securing the spout to the cap in any selected position with respect to the cap, and against separation with relation to the cap, after the cap has been secured to the said nozzle, and in such a position with relation to the cap, that when either the cap or spout is rendered active with respect to the nozzle, the other of them will not interfere with the actively positioned one, said cap being so disposed with

respect to the spout, spaced from and extending across the container discharge opening, that the liquid poured from the container will contact and be deflected by said cap and out of the spout to maintain against pulsation the liquid being poured.

11. As a unitary structure, a spout separate from the cap, said spout having an entrance opening and a discharge outlet, said entrance opening adapted to be secured to the nozzle, means embodying interlocking portions on the cap and spout for securing them together in predetermined relation after the cap is secured to the nozzle, and against separation with respect to each other, said cap and spout being also disposed with respect to each other, that when either one is secured to the nozzle, the other will not interfere with the one that is so actively positioned.

OLOF G. NILSON.

PLAINTIFF'S EXHIBIT 66

468

Mar. 6, 1923.

1,447,712

J. W. DARLEY, JR

CONTAINER

Filed Sept. 21, 1920

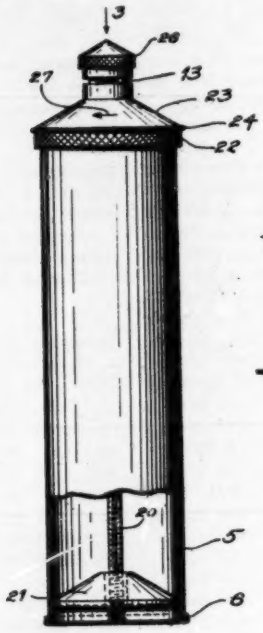


Fig. 1

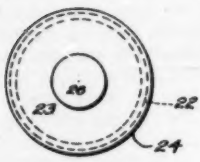


Fig. 3

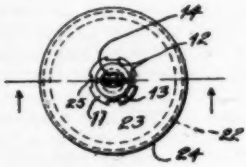


Fig. 4

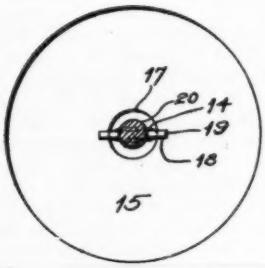


Fig. 5

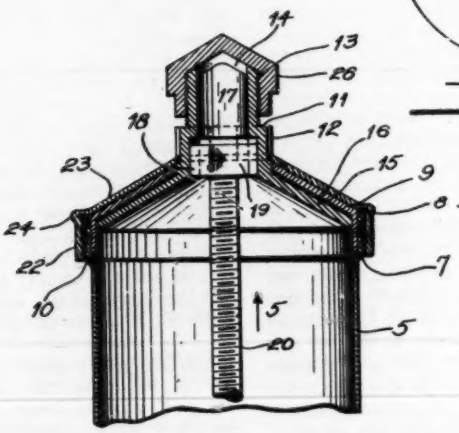


Fig. 2

Inventor

John W. Darley Jr.

469

Patented Mar. 6, 1923. 1,447,712

UNITED STATES PATENT OFFICE.

JOHN W. DARLEY, JR., OF BALTIMORE, MARYLAND, ASSIGNOR TO CHARLES S. COHEN, OF BROOKLYN, NEW YORK.

CONTAINER.

Application filed September 21, 1920. Serial No. 411,822.

To all whom it may concern:

Be it known that I, JOHN W. DARLEY, JR., a citizen of the United States, residing at Baltimore, in the State of Maryland, have invented certain new and useful Improvements in Containers (Case A); and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

My invention relates to containers for tooth paste, shaving creams, cold cream and for any other semi-liquid substances.

Among the objects of my invention are:—

To provide a container which shall be artistic in appearance and which shall not be deformed in use.

To provide a container which can be readily filled and sealed but which will deliver any desired quantity of the contents thereof and shut off the delivery.

To provide a container having means for effectively preventing creeping of the contents after the delivery is shut off.

To provide a container which can be readily formed by the use of simple tools.

In carrying out my invention I make use of the instrumentalities illustrated in the accompanying drawings, in which:—

Figure 1 is a side view of my improved container partly in section.

Fig. 2 is an enlarged sectional view of the upper portion of Figure 1.

Fig. 3 is a view of Figure 1 looking in the direction of the arrow 3 in said figure.

Fig. 4 is a view of the parts shown in Fig. 1 with the closing cap removed.

Fig. 5 is a view of some of the parts shown in Fig. 2 looking in the direction of the arrow 5 in said figure.

In the drawings:—

5 represents a casing which may be formed of any approved material having the bottom 6 crimped at the lower end thereof. The upper end of the casing 5 is formed with the enlarged portion 7 having the flaring upper edge 8.

The frustro-conical end 9 is formed integrally with the cylindrical flange 10 and the latter fits snugly within the enlarged portion 7. Through the frustro-conical end 9 projects the cylinder 11 having the slots 12 and terminating in the threaded end 13 in the end of which is formed the lenticular slot 14.

The cylinder 11 is formed integrally with the frustro-conical portion 15 between which and the frustro-conical portion 9 is mounted the paper washer 16, the purpose of which is to prevent seepage of the paste between the frustro-conical end 9 and portion 15.

A cylindrical hole 17 extends through the cylinder 11 and extension 13 to the lenticular opening 14 and a slot 18 is formed in the cylinder 11 for the reception of the head 19 of the screw 20. On the lower end of the screw 20 there is threaded the plunger 21 which may be of any approved construction and is shaped to closely approach the inner surface of the frustro-conical portion 15.

The operating cap comprises the knurled cylindrical portion 22 and the frustro-conical portion 23 near the juncture of which is a bead 24 the inner surface of which embraces the flaring upper edge 8 and prevents displacement of the operating cap from the container.

The frustro-conical portion 23 is provided with projections 25 which fit in the grooves 12 and thus lock the operating cap to the cylinder 11, and since the slot 18 in the latter embraces the head 19 of the screw 20, it is evident that revolution of the operating cap will produce revolution of the screw 20. The cap 26 is screwed upon the threaded extension 13 to close the slot 14.

In filling my improved container, the screw 20 and piston 21 are to be placed therein as shown. The paste is then to be placed within the container and the slot 18 within the cylinder 11 is to be placed to embrace the head 19 of the screw 20. The paper washer 16 is then to be laid upon the frustro-conical portion 15 and the cylindrical flange 10 of the end 9 is then to be placed within the enlarged portion 7 of the casing 5 and forced to the position shown in Fig. 2. The projections 25 are then to be placed within the slots 12 of the cylinder 11 and moved downwardly until the bead 24 embraces the flaring edge 8. The cap 26 can then be screwed in place and the container is ready for shipment.

When it is desired to use the container, the operator unscrews the cap 26 and then holding the casing 5 in his left hand he applies the thumb and forefinger thereof to the knurled portion 22 of the operating cap and moving his thumb upwardly and his forefinger downwardly, he turns the oper-

ating cap in the direction of the arrow 27 in Figure 1, thus causing the piston 21 to move upwardly, and forcing some of the paste out through the lenticular slot 14.

This effect obtains because the friction between the casing and the piston prevents the latter from turning, and the end of the screw 20 merely rests against the inner surface of the bottom 6.

When a sufficient quantity of the paste has been ejected, the operator then reverses the direction of movement of his thumb and forefinger and turns the operating cap in a direction opposite to the arrow 27, thus causing the piston 21 to move slightly toward the bottom 6 and relieving its pressure from the paste within the container, thus effectively preventing creeping of the paste through the slot 14.

The cap 26 can then be applied to container.

Thus it will be seen that I provide a simple, cheap and effective container, capable of easy filling and preserving its artistic appearance while in use.

I claim:—

1. The combination with a casing, of a piston having frictional engagement therewith, a screw threaded in said piston, an end fixed in said casing, an operating cap revolubly mounted on said casing and a member extending through said end and having operative connection with said screw and cap and an eduction passage to the interior of said casing.

2. The combination with a casing, of a piston having frictional engagement therewith, a screw threaded in said piston, an end fixed in said casing, a member extending through said end and having a flange parallel with said end, a sealing washer between said end and flange, a passage through said member, an operative connection between said screw and member and means for turning said member.

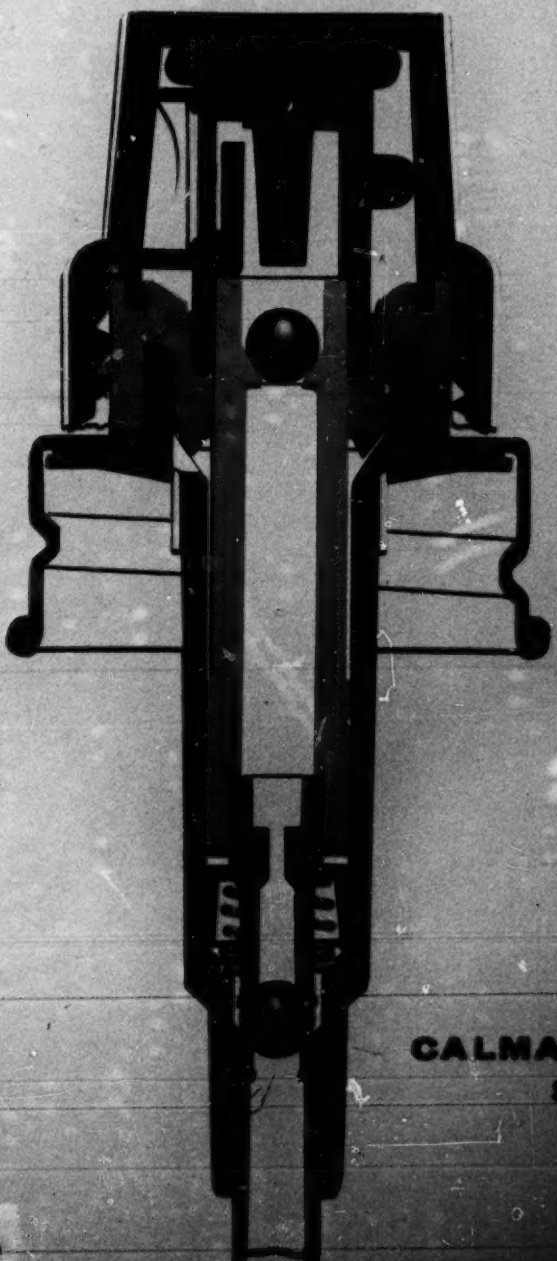
3. The combination with a casing, of a piston therein, a screw threaded in said piston, a member having operative connection with said screw and a passage to the interior of said casing through said member and a cap for operating said member.

In testimony whereof, I affix my signature.

JOHN W. DARLEY, Jr.

PLAINTIFF'S EXHIBIT PP
471

PP

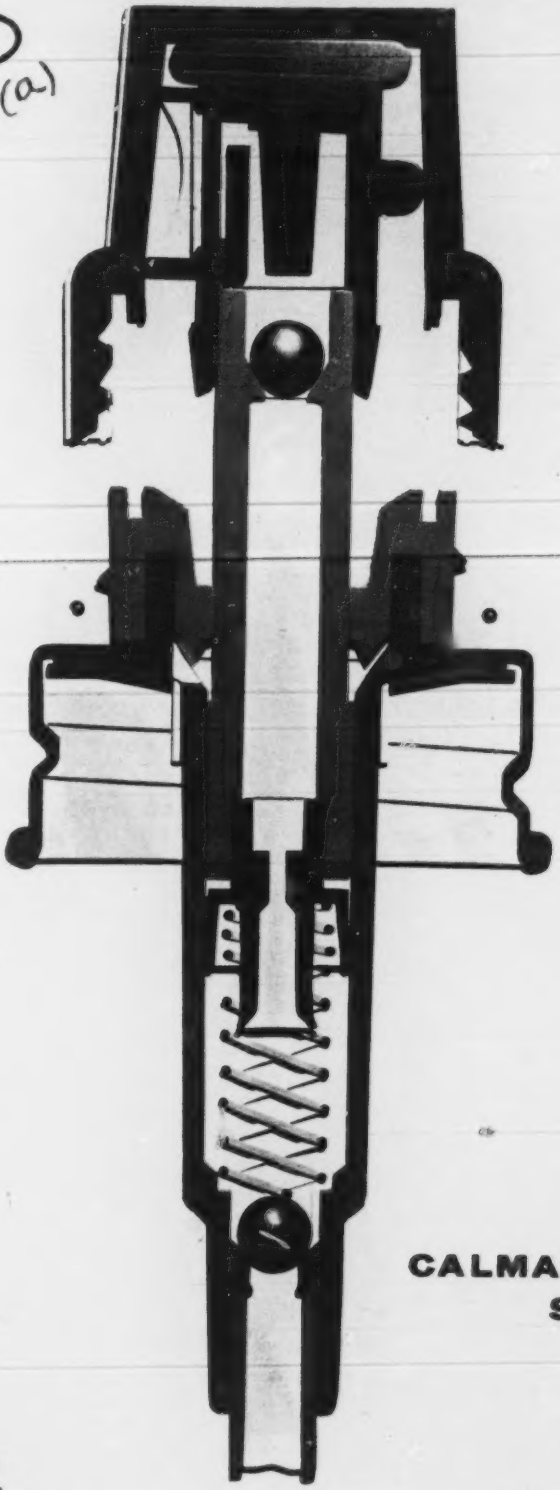


P-PP

PLAINTIFF'S EXHIBIT PP-a

413

PP(a)

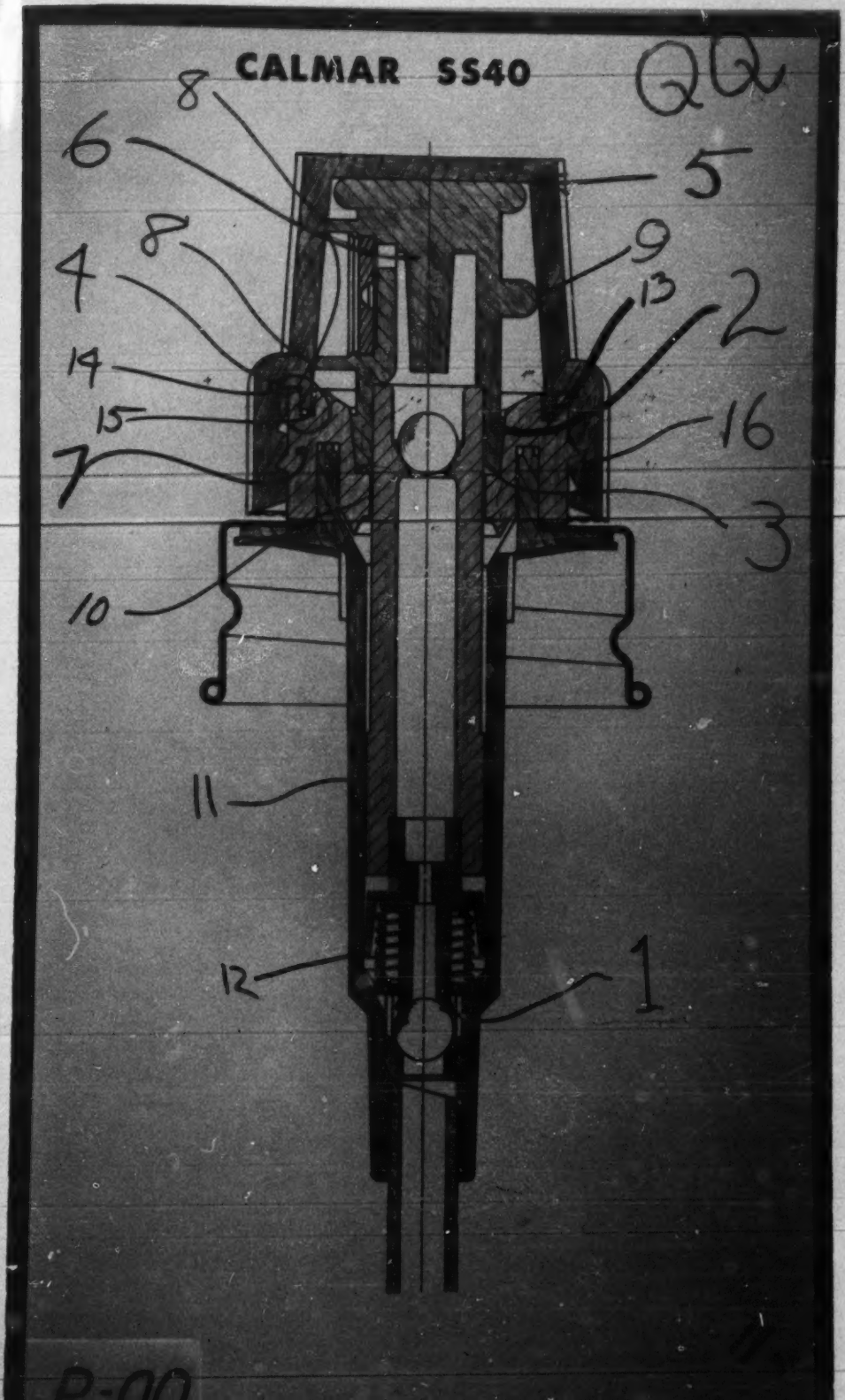


CALMAR
SS-40

P-PP(a)

PLAINTIFF'S EXHIBIT QQ

475



PLAINTIFF'S EXHIBIT VV

477

June 7, 1938. F. W. LOHSE 2,119,884

VV

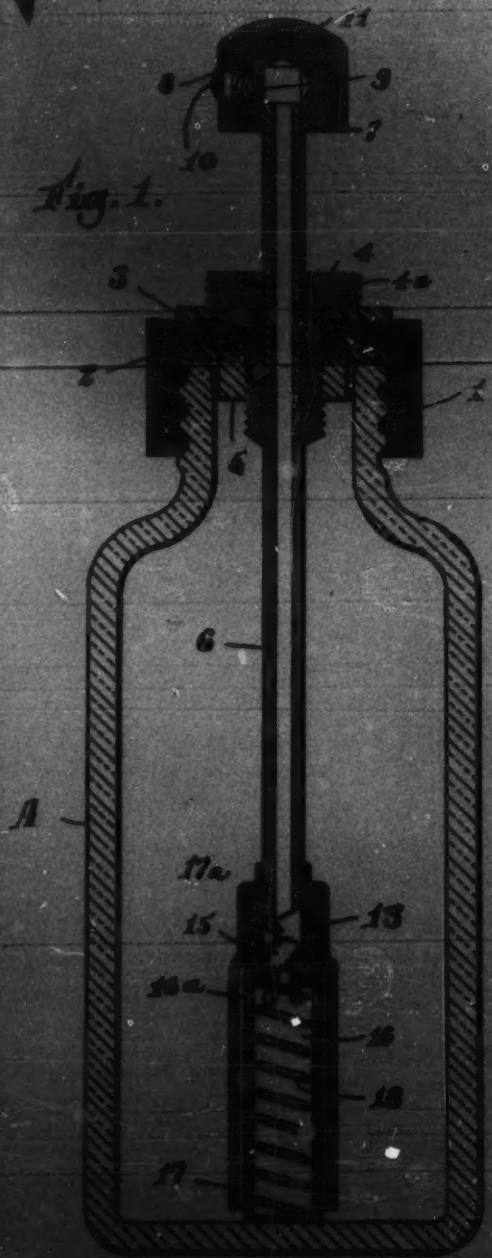


Fig. 1.

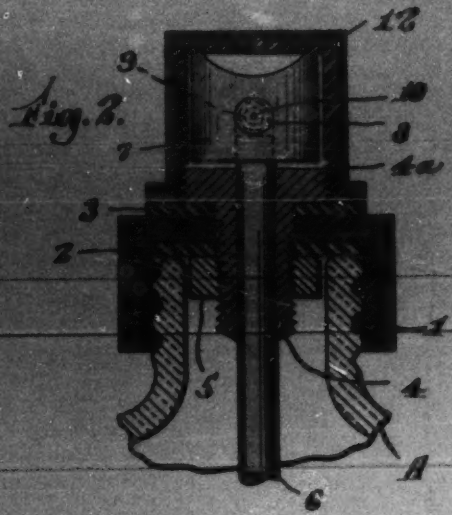


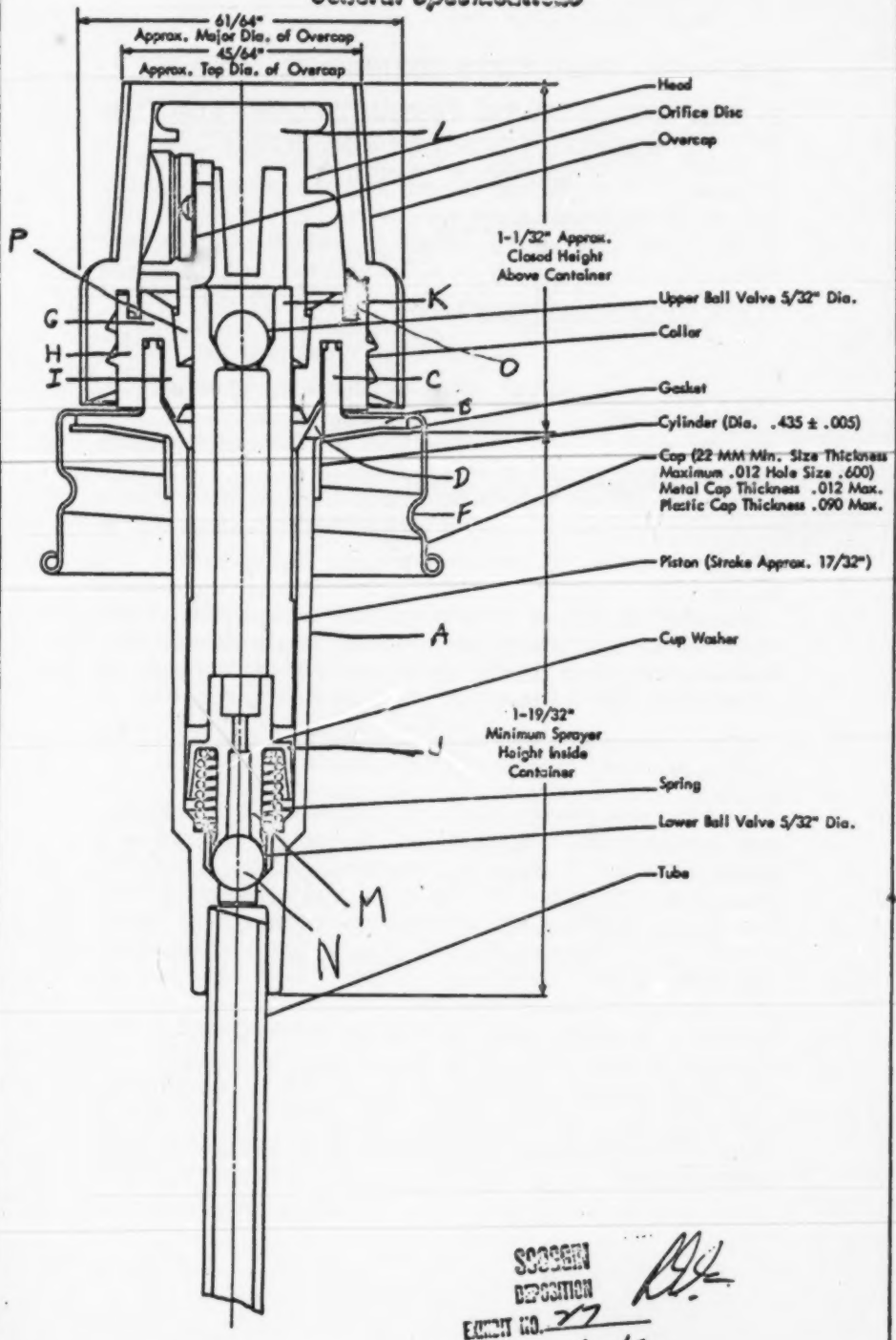
Fig. 2.

PLAINTIFF'S EXHIBIT YY

479

CALMAR'S SS-40 SNIFFER SPRAYER

General Specifications



SOSSEEN
DEPOSITION
EXHIBIT NO. 77

11/27/89

480

[1151] PLAINTIFF'S EXHIBIT ZZ.

IN THE UNITED STATES DISTRICT COURT FOR THE
WESTERN DISTRICT OF MISSOURI
WESTERN DIVISION

CALMAR, INCORPORATED,
Plaintiff,
vs.
COOK CHEMICAL COMPANY,
Defendant.
No. 12,349

COLGATE-PALMOLIVE COMPANY,
Plaintiff,
vs.
COOK CHEMICAL COMPANY,
Defendant.
No. 13,006

STIPULATION

For the purpose of conserving time in the trial of the above actions, it is stipulated by the parties hereto that the following facts be considered established; the right of objection to the relevance of any such fact is reserved.

With respect to pump type sprayers commercialized by Plaintiff

1. Sprayers (called for convenience Calmar 1 Sprayers), constructed essentially as shown in the drawing marked Calmar 1 Sprayers, annexed hereto, designated respectively therein S-20 and S-15, and conforming with the sample sprayers (physical samples referred to herein are in the custody of Wm. H. Curtis, Esq.) marked respectively Calmar 1 S-20 and Calmar 1 S-15, were sold by Plaintiff to Defendant prior to 1956.

[1152] 2. Overcap and sprayer units (called Calmar SS-40 Sprayers), conforming with the sample units marked respectively Calmar SS-40 and Calmar SS-40 (sectioned), were sold by Plaintiff prior to the filing of Civil Action No. 12,349 and are the units charged to infringe the Scoggin patent in suit.

With respect to pump type sprayers commercialized by Defendant

1. Sprayers (called Bakan 1 Sprayers), constructed essentially as shown in the drawing marked Bakan 1 Sprayer, annexed hereto, and conforming with the sample sprayer marked Bakan 1, were made for and used by Defendant prior to 1957; a Bakan 1 sprayer constructed as shown in the drawing marked Bakan 1 was submitted to Injection Molding Company during August 1956 with a request for an estimate of the cost of applying a protective cap thereto.

2. Overcap and sprayer units (called Bakan 2 Sprayers), constructed essentially as shown in the drawing of the Scoggin patent in suit, marked Bakan 2 Sprayers, annexed hereto, and conforming with the sample units marked Bakan 2 and Bakan 2 (sectioned) were made for and used by Defendant in 1957.

3. Overcap and sprayer units (called Bakan 2 Sprayers Modified), conforming with the sample unit marked Bakan 2 (Modified) were made for and used by Defendant beginning as early as November 1959 and are the units described in the opening paragraph and in the immediately following numbered paragraphs 1, 2 and 3 of Scoggin Deposition Exhibit 67, annexed hereto.

4. Overcap and sprayer units (called Bakan 3 Sprayers), constructed essentially as shown in the drawing marked Bakan 3 [1153] Sprayer, annexed hereto, and conforming with the sample units marked respectively Bakan 3 and Bakan 3 (sectioned) were made for and used by Defendant beginning in 1960 and continuing thereafter and are the units to which reference is made in the last two sentences on page 1 of Scoggin Deposition Exhibit 67.

With respect to pump type sprayers manufactured by Plaintiff's predecessor Calmar Company

1. Devices (called Calmar Jetomizers), constructed essentially as shown in the patent to Turnbull et al 2,434,875, marked Calmar Jetomizer, annexed hereto, and conforming with the sample device marked Calmar Jetomizer, were sold by Calmar Company, predecessor of Plaintiff Calmar, Inc., prior to 1950.

With respect to dispensers made and sold by others than Plaintiff and Defendant

1. Adapters (called Pouring Spout and Cap Assemblies), conforming with the sample spout and cap units marked respectively Baker Spout and Baker Spout (sectioned), Baker Cap and Baker Cap (sectioned) were made for and used by the J. T. Baker Chemical Company of Phillipsburg, New Jersey, on containers for hydrofluoric acid of the type marked Baker Container, prior to 1956.

2. Sprayers (called Lohse Type Sprayers), conforming with the sample sprayer marked Lohse Type were made and sold by the T. J. Holmes Company of Chartley, Massachusetts prior to 1940.

With respect to Scoggin Deposition Exhibit 67

Scoggin Deposition Exhibit 67, the circular letter dated November 1959, annexed hereto, was distributed to customers of Bakan over the signature of and by authority of Jim Groebe, Senior Vice President of Bakan, on or about the date it bears.

[1154] It is further stipulated and agreed that depositions taken in the pre-trial discovery of either party need not be signed by the witnesses, as required by earlier stipulations herein.

/s/ W. H. Curtis
Morrison, Hecker, Cozad & Morrison
1701 Bryant Building (VI 2-5910)
Kansas City 6, Missouri
Attorneys for Plaintiff Calmar, Incorporated, in Action No. 12,349

/s/ Howard A. Crawford
Lathrop, Righter, Gordon & Parker
15 West Tenth Street (VI 2-0820)
Kansas City 5, Missouri
Attorneys for Plaintiff Colgate-Palmolive Company in Action No. 13,006

/s/ Gordon D. Schmidt
Hovey, Schmidt, Johnson & Hovey
1816 Federal Reserve Bank Building
Kansas City, Missouri
Attorneys for Defendant Cook Chemical Company in Actions Numbered 12,349 and 13,006

[1155] BAKAN PLASTICS

Division of Cook Chemical Company

P. O. Box 78 2500 Summit Kansas City 41, Missouri
Phone VIctor 2-8092

November, 1959

(Scoggin Deposition Exhibit No. 67.)

Re: Re-designed and Re-engineered Model 2 Leak Proof Sprayer

I am sure you will be interested in seeing our new leak proof sprayer equipped with a new cap and collar. This new cap and collar has the following advantages:

1. The cover cap can be tightened to a uniform torque at our plant—this eliminates extra cost for our customers.
2. This new cover cap is designed so that it makes a perfect seal on the collar—which the old one would not do.
3. This cover cap has more eye appeal—than the old one. This unit can be equipped with a cap 24mm or larger. We recommend that the customers should use a cap 26mm or larger, because the O. D. of the cover cap is larger than the O. D. on a 24mm, as an example. In other words, if the base cap has a smaller O. D. than the cover cap, it makes it impossible to tighten the metal cap unless they have a special capper.

We are now in production and all sprayers manufactured from now on will be equipped with this new cap and collar. Our engineering department is also re-designing and re-engineering the head mold, the orifice mold, and the plunger mold and we expect to have this work done by January 1st—possibly sooner. With this new development, we will be able to furnish you a completely leak proof sprayer, which will eliminate any leakage back into the cap.

[1156] We are mailing you the samples now, so that you can see how we are improving this unit, which will be a real

help to you. I might also add that this sprayer is covered by patent number 2,870,943.

Of course, our sales representative, the will be glad to answer any questions you may have regarding this unit.

Yours very truly,

BAKAN PLASTICS

/s/ Jim Groebe
Jim Groebe
Sr. Vice President

JG:lg

P.S.—Enclosed you will find catalog pages which illustrate both model 1 and model 2 sprayers—long and short stroke—which will give you prices on either unit. We are also enclosing samples of our model 1.

485-

BAKAN
MODEL 2 LEAKPROOF SPRAYER

PRICES

QUANTITY	PRICE PER THOUSAND
1,000	$84.00 per thousand
5,000	81.00 per thousand
10,000	79.00 per thousand
25,000	77.00 per thousand
50,000	76.00 per thousand
100,000 and up	Annual Contract quoted on request

TERMS

TERMS: 1% 10 Days — Net 30
F.O.B. Kansas City, Missouri
MINIMUM ORDER: 1,000 Sprayers to case
CASE WEIGHT: 34 lbs.

COLORS:

ALL WHITE or WHITE plunger with RED, BLUE, GREEN or YELLOW head and collar. Be sure to specify color when ordering.

Special color combinations available in quantities of 100,000 or more Prices quoted on request.

CAPS:

Available in stock in following sizes and colors:

WHITE METAL—20, 22, 24, 26, 28, 33mm, 400 finish
BLUE METAL—26 & 28mm
YELLOW METAL—28mm
BLACK BAKELITE—24 & 28mm—$3.00/M extra
WHITE UREA—24 & 28mm—$6.00/M extra

Bakan can furnish metal or molded caps in any size or color in quantities of 100,000 or more. Prices quoted on request.

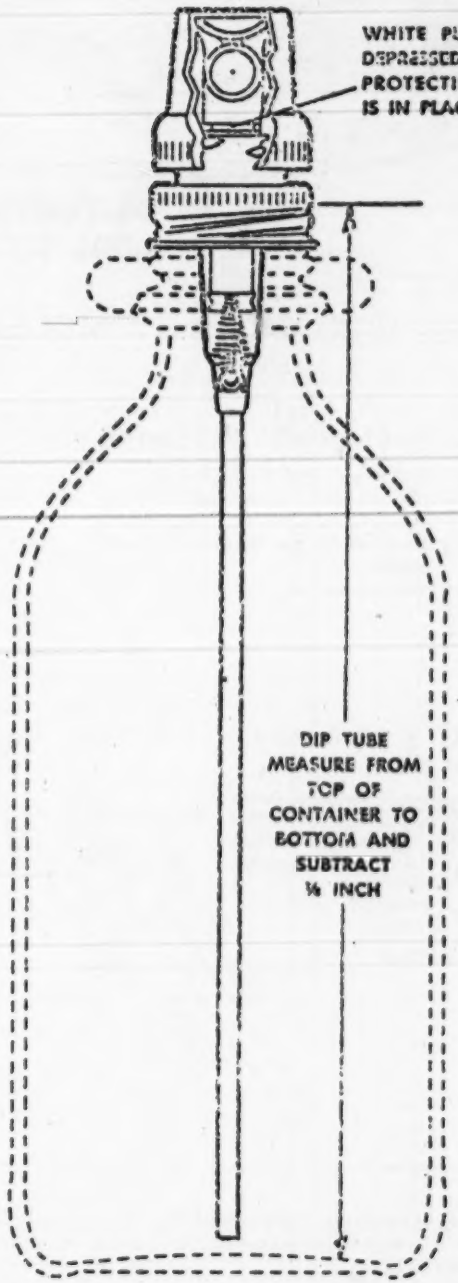
If customer furnishes molded caps, there will be a boring charge of $2.50/M.

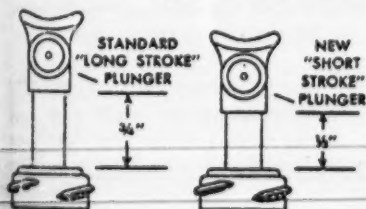
DIP TUBES:

Dip tubes will be cut to any desired length at no additional cost. When ordering specify over-all length from top of container to desired depth. Please submit sample bottle or container to insure accuracy.

NOTE: When ordering be sure to specify: Model Number, Cap size and color, Sprayer color, Dip Tube length, Plunger (standard or short).

MC 2 PLASTIC SPRAYER





NEW SHORT STROKE PLUNGER NOW AVAILABLE

Bakan sprayers may now be equipped with the new short stroke plunger which delivers less volume and is specifically designed for products such as window cleaners, spot removers, hair sprays, etc.

The standard, long stroke plunger is ideally suited for insecticides and other products where delivery of greater volume per stroke is desired.

When ordering specify short plunger if desired. Unless otherwise specified, sprayers will be equipped with standard, long stroke, plunger.

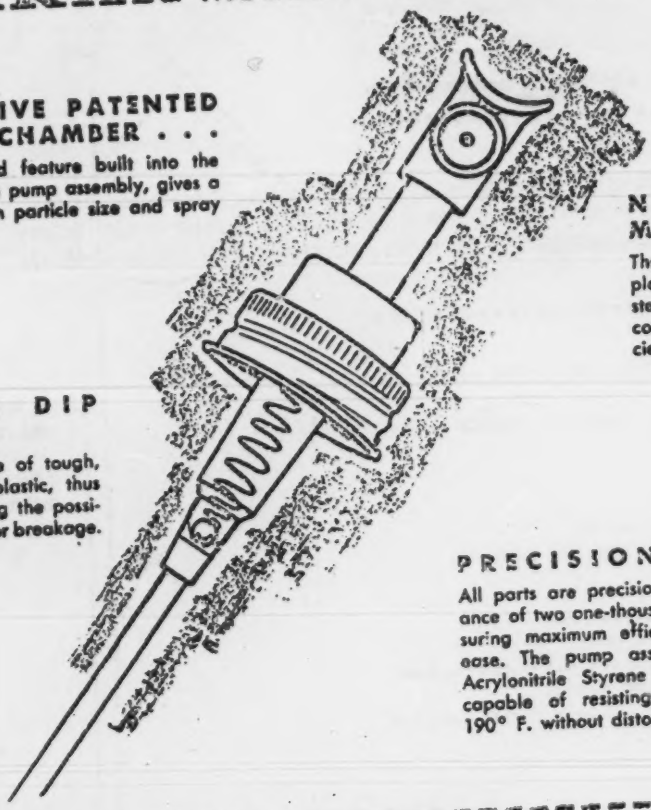
486

PRECISION MADE

Sprayers and Dispensers

DESIGNED FOR HIGH QUALITY, AT LOW COST! ADDS STYLE AND PERFORMANCE TO ANY PRODUCT

THE BAKAN MODEL 1 PLASTIC SPRAYER...



EXCLUSIVE PATENTED SWIRL CHAMBER . . .

This patented feature built into the high-pressure pump assembly, gives a more uniform particle size and spray pattern.

NON CORROSIVE METAL PARTS...

The sprayer contains two nickel-plated steel balls and a stainless steel spring, which eliminates corrosion and gives a more efficient, double-acting valve.

PLIABLE DIP TUBE...

The tube is made of tough, semi-rigid vinyl plastic, thus greatly eliminating the possibility of damage or breakage.

PRECISION BUILT...

All parts are precision molded to a tolerance of two one-thousandths of an inch, insuring maximum efficiency and operating ease. The pump assembly is molded of Acrylonitrile Styrene Copolymer (TYRIL) capable of resisting temperatures up to 190° F. without distortion.

The plastic components of the BAKAN Model 1 sprayer is compatible with most chemicals where sprayers are commonly used. It is suggested, however, that your product be thoroughly tested with the sprayers to make sure they are suitable for your product.

BAKAN offers your company specialized laboratory analysis and will develop and design special sprayers or dispensers to fit your product and package.

distributed by:

BAKAN Plastics 2300 SUMMIT, KANSAS CITY 41, MISSOU

487

BAKAN

MODEL 1 SPRAYER

PRICES

QUANTITY	PRICE PER THOUSAND
1,000	$74.00 per thousand
5,000	71.00 per thousand
10,000	69.00 per thousand
25,000	67.00 per thousand
50,000	66.00 per thousand
100,000 and up	Annual Contract quoted on request

TERMS

TERMS: 1% 10 Days — Net 30
F.O.B. Kansas City, Missouri
MINIMUM ORDER: 1,000 Sprayers
PACKED: 1,000 Sprayers to case
CASE WEIGHT: 28 lbs.

COLORS:

ALL WHITE or WHITE plunger with RED, BLUE, GREEN or YELLOW head and collar. Be sure to specify color when ordering.

Special color combinations available in quantities of 100,000 or more Prices quoted on request.

CAPS:

Available in stock in following sizes and colors:

WHITE METAL—20, 22, 24, 26, 28, 33mm, 400 finish
BLUE METAL—26 & 28mm
YELLOW METAL—28mm
BLACK BAKELITE—24 & 28mm—$3.00/M extra
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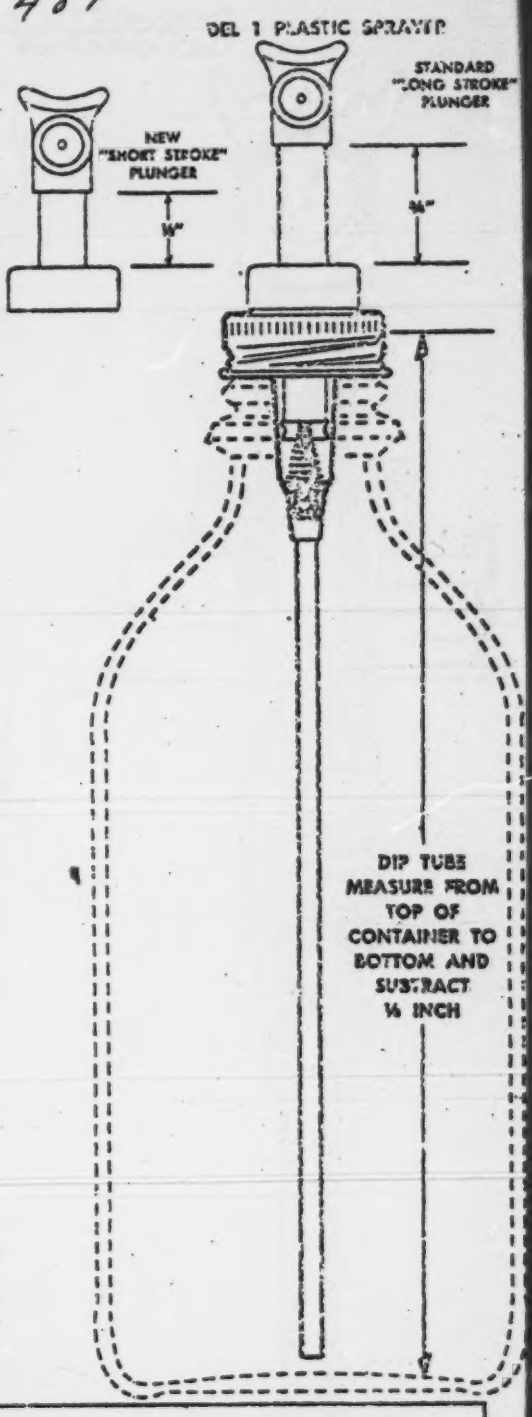
Bakan can furnish metal or molded caps in any size or color in quantities of 100,000 or more. Prices quoted on request.

If customer furnishes molded caps, there will be a boring charge of $2.50/M.

DIP TUBES:

Dip tubes will be cut to any desired length at no additional cost. When ordering specify over-all length from top of container to desired depth. Please submit sample bottle or container to insure accuracy.

NOTE: When ordering be sure to specify: Model Number, Cap size and color, Sprayer color, Dip Tube length, Plunger (standard or short).

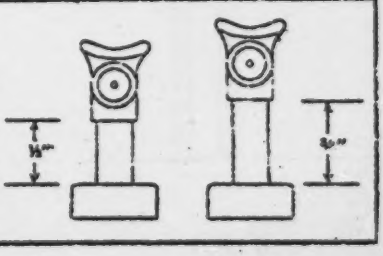


NEW SHORT STROKE PLUNGER NOW AVAILABLE

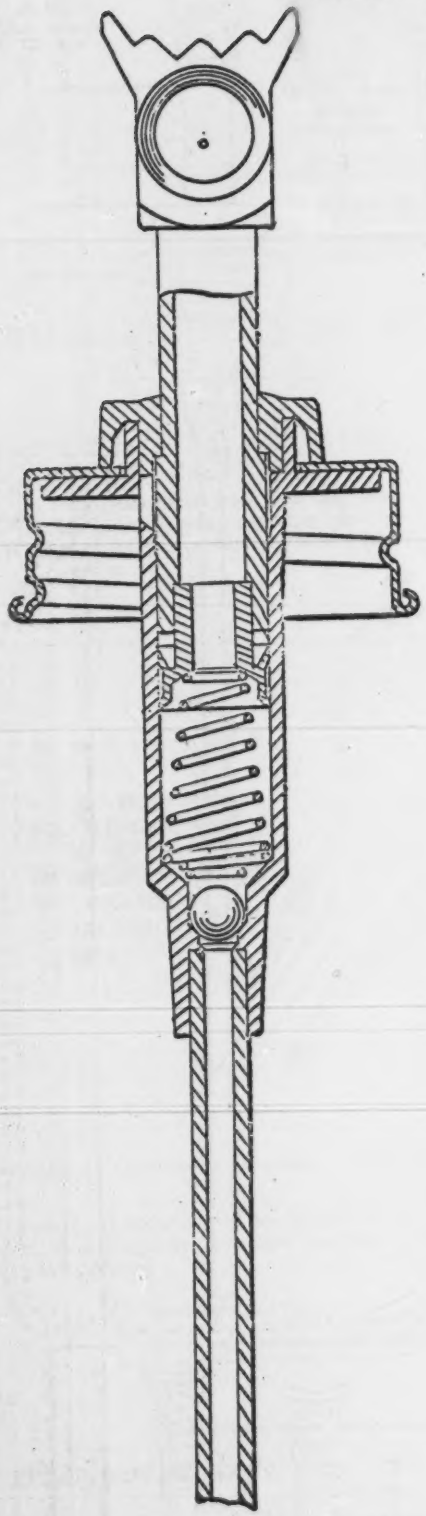
Bakan sprayers may now be equipped with the new short stroke plunger which delivers less volume and is specifically designed for products such as window cleaners, spot removers, hair sprays, etc.

The standard, long stroke plunger is ideally suited for insecticides and other products where delivery of greater volume per stroke is desired.

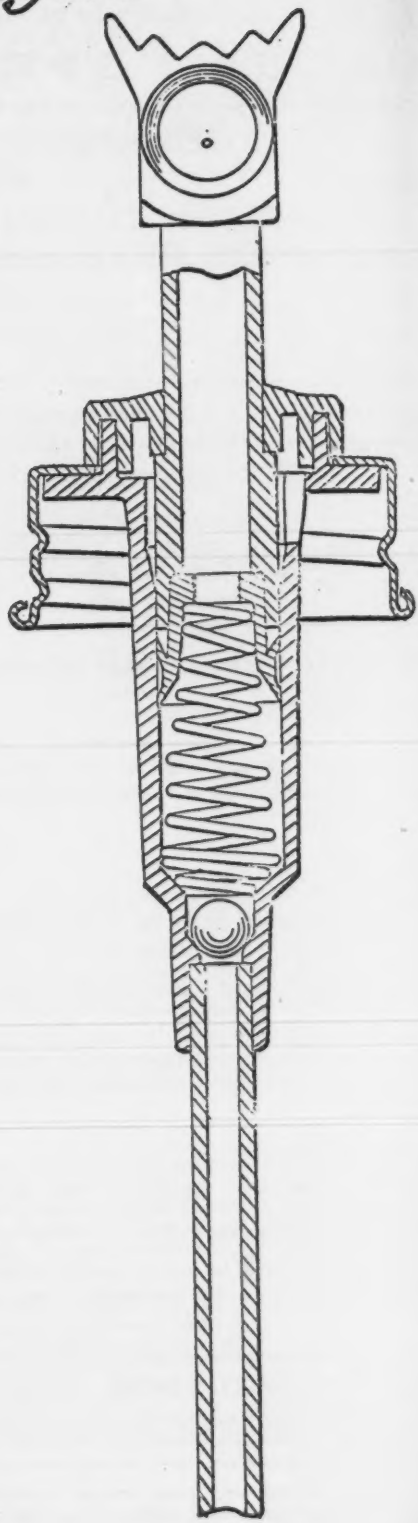
When ordering specify short plunger if desired. Unless otherwise specified, sprayers will be equipped with standard, long stroke, plunger.



Calmar I Sprayers



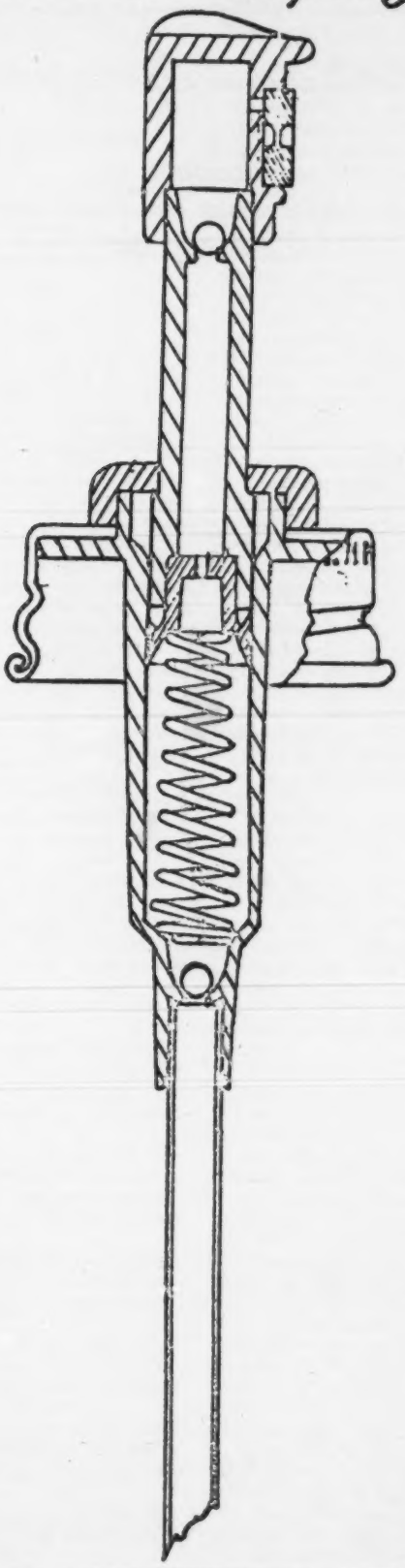
S 20



S 15

489

Bakan 1 Sprayer



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Bahan 2 Sprayer

Jan. 27, 1959 B. I. SCOGGIN, JR 2,870,943

PUMP-TYPE LIQUID SPRAYER HAVING HOLD-DOWN CAP

Filed March 4, 1957

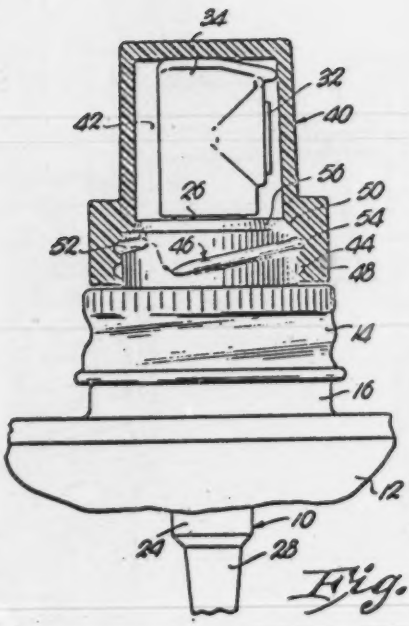


Fig. 1.

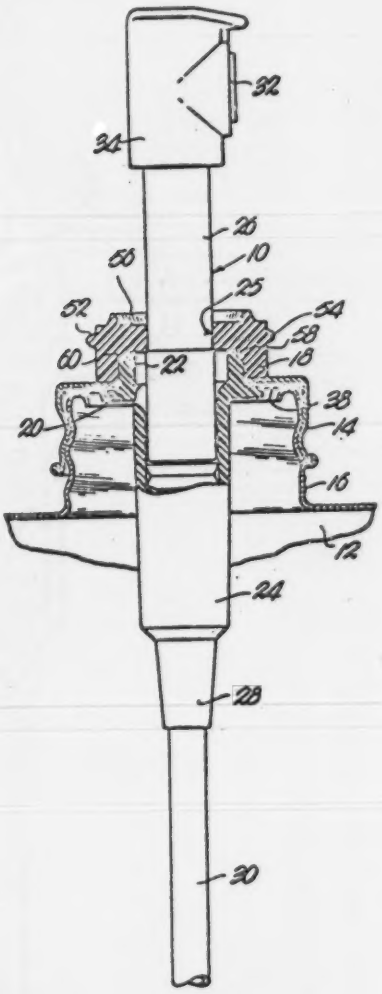


Fig. 2.

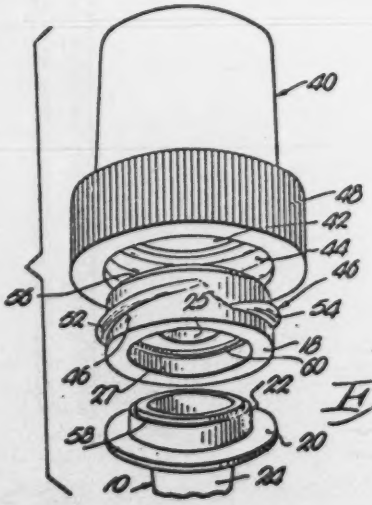


Fig. 3.

INVENTOR.
Baxter I. Scoggin
BY
ATTORNEY

United States Patent Office 2,870,943
491
Patented Jan. 27, 1959

2,870,943

PUMP-TYPE LIQUID SPRAYER HAVING HOLD-DOWN CAP

Baxter I. Scoggin, Jr., Kansas City, Mo., assignor, by mesne assignments, to Cook Chemical Company, Kansas City, Mo., a corporation of Missouri

Application March 4, 1957, Serial No. 643,711

4 Claims. (Cl. 222—182)

This invention relates to improvements in structures for dispensing liquids wherein is provided a spray-type hand pump mounted within a container for the liquid through use of the closure cap of such container.

It is common practice, as exemplified for example by Patent No. 2,362,080, issued November 7, 1944, to dispense various types of liquids such as insecticides, through use of a finger-manipulated spray pump normally sold as a component part of the container itself. The pump includes a vertically reciprocable plunger extending upwardly beyond the top of the cap within which the pump is mounted and provided with a spray head or nozzle structure capable of emitting a fine mist-like spray when the plunger is depressed by engagement with a finger-receiving saddle forming a part of the spray head.

Difficulties have been experienced in the field by virtue of the inherent nature of such structure since accidental actuation of the plunger causes dispensing of the fluid and oftentimes the material is used in part by store employees prior to sale because of the ready accessibility to the pump itself.

It is the most important object of the present invention, therefore, to provide structure for rendering the pump inoperable during shipment and while in storage, as well as on the shelves of the retail dealer.

Another important object of the present invention is to provide structure capable of carrying out the functions above set forth which is also adapted to enclose the head of the plunger and thereby protect the same, as well as handlers of the merchandise by virtue of the fact that the said plunger is completely enclosed and held at the innermost end of its reciprocable path of travel.

A further object of the instant invention is to provide a hold-down cap that may be quickly and easily applied and removed by virtue of a releasable attachment to a part of the entire unit such as by use of screw-threaded interengagement therewith.

A further object of this invention is to provide improvements of the aforementioned character that advantageously employs a part of the unit which has a secondary function of attaching the barrel of the spray pump to the closure cap of the container.

Other objects include important details of construction to be made clear or become apparent as the following specification progresses, reference being had to the accompanying drawing, wherein:

Figure 1 is a fragmentary, elevational view of a liquid container showing a pump-type sprayer as a part thereof and including the novel hold-down cap of the instant invention, parts being in section for clearness.

Fig. 2 is a fragmentary, vertical, cross-sectional view through the container and its cap showing the pump assembly in its operable position with the hold-down cap removed; and

Fig. 3 is an exploded perspective view showing the hold-down cap and certain parts of the sprayer with which the same is operably associated.

Pump-type sprayer 10 for liquid container 12 is attached to cap 14 for retention thereby when cap 14 is removed from threaded neck 16 of container 12, and if desired, there may be provided sufficient clearance between cup-shaped retainer 18 and annular outturned flange 20 to permit rotation of cap 14 relative to sprayer 10.

Both cap or closure 14 and retainer 18 are received by a cylindrical extension 22 of frusto-conical barrel 24, forming a part of the sprayer 10, extension 22 being integral with flange 20 at the innermost edge of the latter. Flange 20 is integral with barrel 24 near the larger, uppermost edge of the latter and is held against the under side of gasket 38 in the cap 14 when the sprayer 10 is operably associated with container 12.

Retainer 18 is provided with a central opening 25 which receives tubular plunger 26 and has a cavity 27 that accommodates the enlarged extension 22 as is clear in Fig. 2. Retainer 18 is fitted tightly over the extension 22 and maintains the retainer in place with flange 20 against gasket 38 as above set forth.

Reduced end 28 of barrel 24 receives a tube 30 that extends to the bottom of container 12, it being understood that the sprayer 10 is internally constructed in a suitable manner as, for example, in accordance with teachings of the aforementioned patent to pump liquid from the container 12 into the tube 30 and thence through nozzle 32 forming a part of a spray head 34 secured to the uppermost end of plunger 26. The enlarged head 34 is normally depressed by one finger as the operator grasps the container 12 as is well understood in this art.

Cap 14 has a clearance opening therein, as best shown in Fig. 2, for the extension 22 of barrel 24 and when the cap 14 is in screw-threaded engagement with neck 16, the gasket 38 which surrounds barrel 24, is clamped tightly between flange 20 and the under side of the top of cap 14.

A hold-down member broadly designated by the numeral 40, is provided to hold the plunger 26 at the lowermost end of its path of travel within the barrel 24 in the manner illustrated by Fig. 1, it being understood as by reference to said patent, that a spring (not shown) within the barrel 24, yieldably biases the plunger 26 upwardly to the position shown in Fig. 2. The hold-down member 40 is preferably in the nature of a hollow cap so that the same not only encloses or houses the upper end of plunger 26, i. e. spray head 34, but releasably attaches to the retainer 18 and also houses the latter.

A cylindrical bore 42 within the hold-down cap 40 receives the head 34 as seen in Fig. 1, and enlargement of the bore 42 adjacent the lowermost open end of the cap 40 is provided with internal screw threads 44 that mesh with external screw threads 46 on the retainer 18, thereby releasably attaching the cap 40 to the retainer 18.

An enlarged, annular boss 48 on the cap 40 is provided with a ribbed, outermost surface to facilitate mounting and removal of the cap 40 relative to retainer 18. A downwardly-facing shoulder 50 within the cap 40 engages the upper surface of retainer 18, thereby preventing engagement between cap 40 and closure 14 to prevent forcing of the retainer 18 from its tight press-fit engagement with extension 22. As illustrated, the screw threads 46 on the retainer 18 are in the nature of a pair of substantially semi-circular, spirally arranged sections 52 and 54, permitting molding of the retainer 18 with its screw threads 46 as a single unitary part.

In addition to the seal provided between shoulder 50 and the top surface of retainer 18, there is established an additional annular seal between annular rib 56 and the annular surface of cap 40 immediately adjacent to shoulder 50. This seal is clearly illustrated in Figure 1. The cross-sectional contour of rib 56 is as shown

492

in Fig. 2 to present an upwardly and inwardly inclined annular face which snugly fits against the "corner" or line of juncture between shoulder 50 and the adjacent annular inner face of cap 40.

The interfitting surfaces between extension 22 and retainer 18 are as illustrated in Fig. 2. There is an annular notch formed in extension 22 at the outer extremity thereof and this notch 58 receives a similarly formed, continuous annular projection 60 formed integrally with retainer 18 and at a point where elements 58 and 60 will interlock when the parts are in assembled condition.

Thus, any accidental leakage or seepage from container 12 through the parts after they are assembled is obviated.

The material from which retainer 18 is produced is soft enough to be slightly compressed when shoulder 50 and the corner adjacent thereto, rides along the upwardly and inwardly inclined outer face of rib 56 when cap 40 is moved to position.

Having thus described the invention what is claimed as new and desired to be secured by Letters Patent is:

1. In a closure assembly for an open-top container having a perforated cap over said open top thereof mounting a spray unit including a barrel provided with a tubular extension passing coaxially upwardly through the perforation in said cap, a plunger reciprocably carried by the barrel and normally extending therebeyond and a spray head on the upper end of the plunger above said extension, the combination with said spray unit of an annular retainer telescoped over and secured to the extension above said cap and provided with external, circumferentially disposed screw threads and an annular, continuous segment at the upper part of the retainer above said screw threads, and a cup-shaped hold-down member housing the head and holding the plunger depressed at substantially the innermost path of travel thereof within the barrel, said member being provided with internal screw threads complementally engaging said screw threads on the retainer and having an internal, circumferentially extending, continuous shoulder disposed to engage said segment around the entire periphery thereof and thereby present a liquid-tight seal located between the spray head and said threads on the retainer and said member respectively, said shoulder being spaced from the lower annular peripheral edge of the member a distance at least slightly less than the distance from that portion of said segment normally engaged by said shoulder, to the proximal upper surface of the cap whereby said lower edge of the member is maintained out of contacting relationship with the cap when the member is on the retainer in a position with said shoulder in tight sealing engagement with the segment.

2. A closure assembly as set forth in claim 1 wherein one of the normally interengaged surfaces of the shoulder and segment respectively is substantially conical to present an inclined annular face coaxial with the member and said retainer and of sufficient diameter at the largest end thereof to cause the seal effected between the shoulder and said segment to become tighter as the shoulder slides on said segment during shifting of the member toward the cap.

3. A closure assembly as set forth in claim 2 wherein said retainer is provided with a continuous, annular rib integral with the normally upper edge thereof and defining said segment, said rib having an outwardly facing, inclined surface presenting said conical face and of greatest external diameter at the zone of juncture of the rib with the retainer, said member having a pair of inner, coaxial, longitudinally spaced, cylindrical surfaces, the innermost cylindrical surface having a smaller diameter than the outermost cylindrical surface and presenting said shoulder therebetween lying in a plane perpendicular to the axes of said cylindrical surfaces, the diameter of said innermost cylindrical surface of the member being intermediate the diameters of opposed external end margins of said rib.

4. A closure assembly as set forth in claim 3 wherein the member and retainer are constructed of materials having different coefficients of hardness whereby one of the interengaged faces of the rib and said shoulder respectively is deformed as the member is shifted toward the cap to thereby produce a more effective seal therebetween.

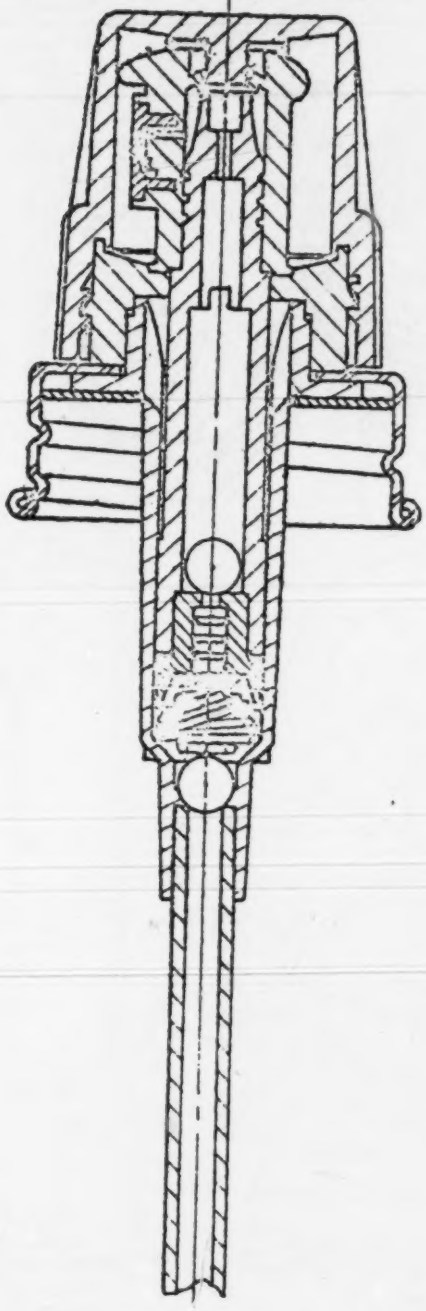
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493

Bakan 3 Sprayer



494

Calmar Jetomizer

Jan. 20, 1948. F. M. TURNBULL ET AL 2,434,875

JETTING DEVICE

Filed Aug. 11, 1945 2 Sheets-Sheet 1

Fig. 1.

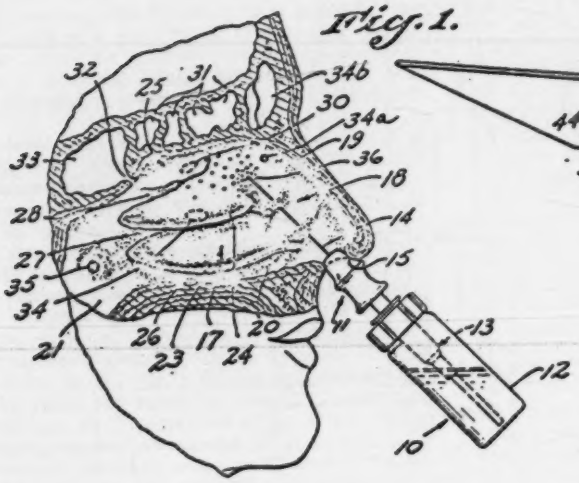


Fig. 2.

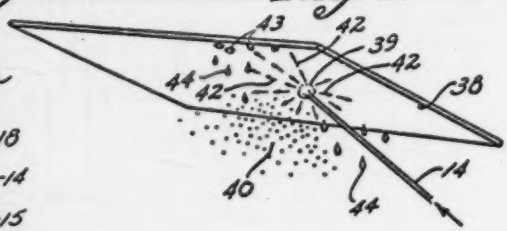


Fig. 3.



Fig. 4.

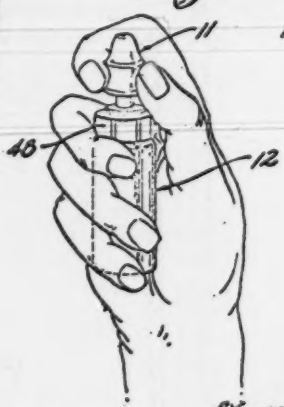
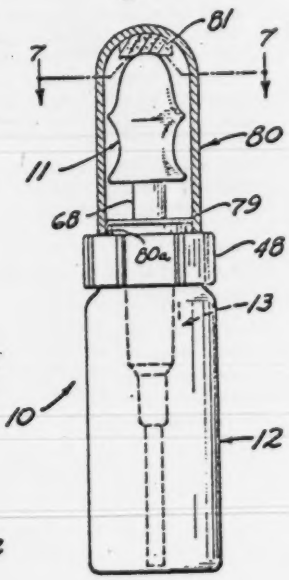


Fig. 5.



INVENTORS:
FREDERICK M. TURNBULL,
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BY HARRIS, KIECH, FOSTER & HARRIS,

Clarence F. Kiech

FOR THE FIRM
ATTORNEYS.

495

Jan. 20, 1948. F. M. TURNBULL ET AL 2,434,875

JETTING DEVICE

Filed Aug. 11, 1945 2 Sheets-Sheet 2

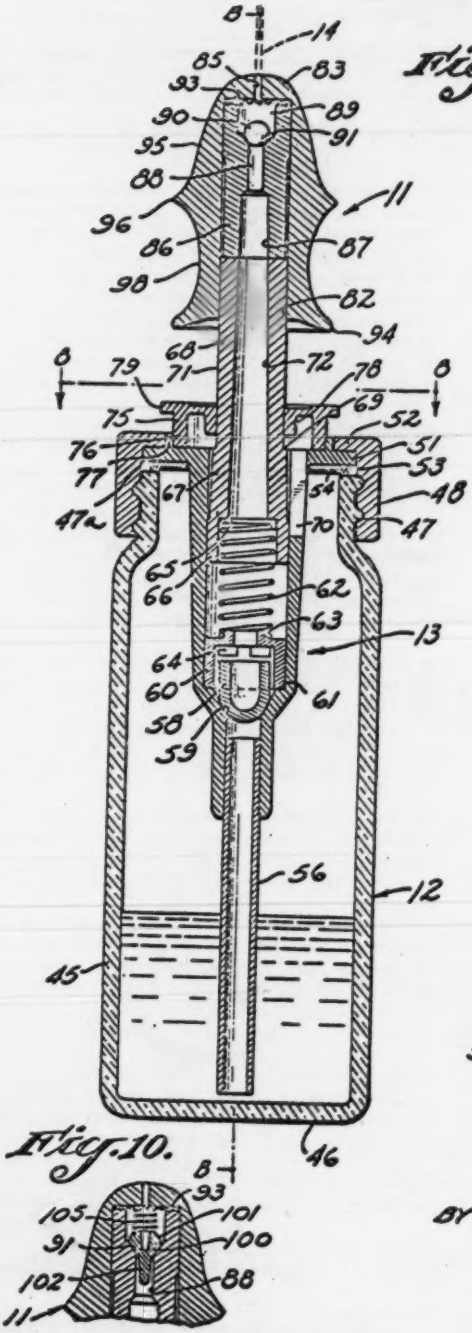


Fig. 6.

Fig. 7.

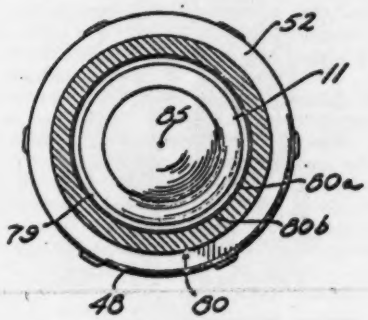


Fig. 8.

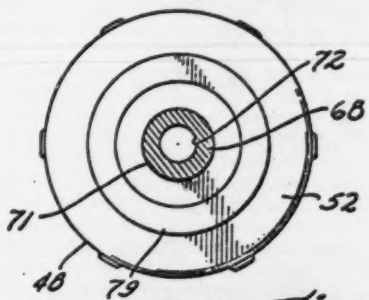


Fig. 9.



Fig. 10.

INVENTORS:
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Clarence F. Kiech

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ATTORNEYS.

PLAINTIFF'S EXHIBIT AB

496

Nov. 20, 1962 B. I. SCOGGIN, JR., ETAL 3,064,865

SPRAYER HEAD HAVING IMPROVED SEALING AND DISCHARGING MEANS

Filed Aug. 24, 1959

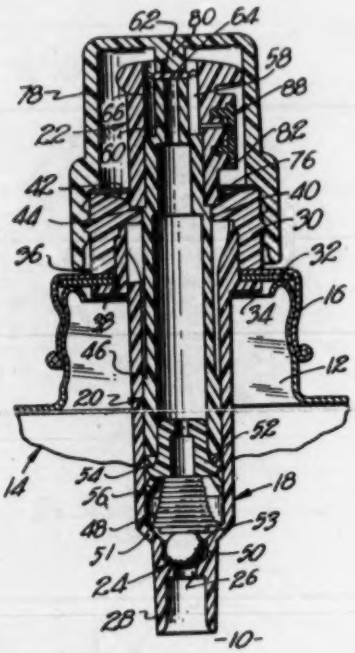


Fig. 1.

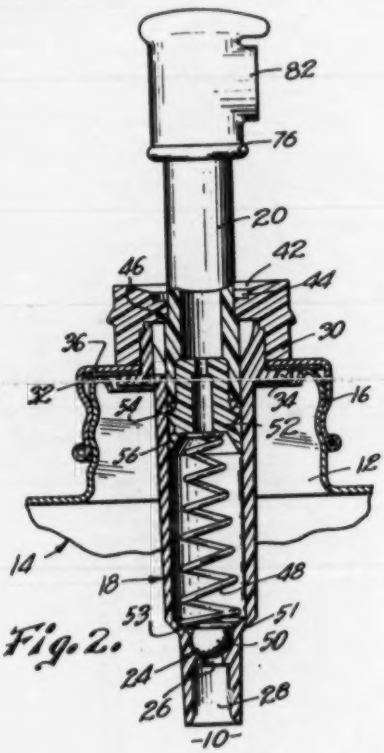


Fig. 2.

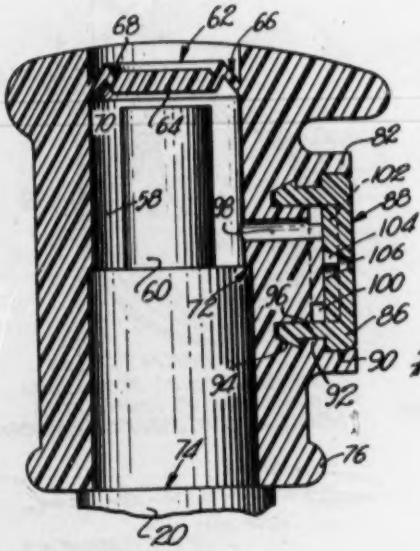


Fig. 3.

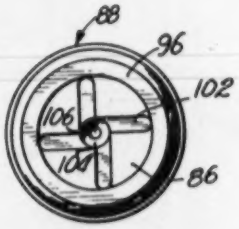


Fig. 4.

INVENTORS.
Baxter I. Scoggin Jr.
BY Woodrow E. Vaughan

Harvey, Schmidt, Johnson & Harvey
ATTORNEYS.

United States Patent Office 3,064,865 Patented Nov. 20, 1962

3,064,865
SPRAYER HEAD HAVING IMPROVED SEALING AND DISCHARGING MEANS

Baxter I. Scoggin, Jr., Kansas City, and Woodrow E. Vaughan, Independence, Mo., assignors to Cook Chemical Company, Kansas City, Mo., a corporation of Missouri

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8 Claims. (Cl. 222—321)

This invention relates to improvements in pumps or sprayers and particularly to that class of spraying attachments for containers commonly employed for example, in the dispensing of insecticides and other fluids, the primary object being to eliminate leakage problems when the pump or sprayer is not in use. Hand pumps of the kind used in small containers and utilizing a spring-loaded reciprocable plunger are prone to leak while in storage, and although the discharge head of the sprayer may be held depressed and enclosed within a cap, such improvement of itself does not prevent leakage into the cap.

It is the most important object of the present invention, therefore, to provide a valve that blocks the normal flow of the fluid to the outlet orifice of the discharge head whenever the plunger is held depressed at the inner end of its path of travel.

Another important object of the present invention is to provide a diaphragm valve in the nature of a flexible membrane that may be held closed while the pump plunger is depressed through use of a hold-down member that of itself, need not either house the discharge head or operate as a sealing means.

Another important object of the present invention is to eliminate leakage from between the plunger and the barrel of the pump within which the plunger is reciprocably mounted through the medium of a seal between the discharge head and the barrel that is likewise held in a sealing condition by the hold-down member aforementioned.

Another object of the present invention is to provide in the aforementioned diaphragm valve, a special construction permitting flexing without stretching of the material from which the membrane is made.

Another object of the present invention is to provide a control nozzle for the discharge head of the pump that has novel interlocking means with the head, as well as a unique arrangement for utilizing the fluid pressure itself as the means for sealing the nozzle with respect to the head, eliminating the necessity of using adhesive to hold the nozzle in place.

In the drawing:

FIG. 1 is a vertical, cross-sectional view of a pump provided with a sprayer head having improved sealing and discharging means made pursuant to my present invention, the container within which the pump is mounted being illustrated fragmentarily.

FIG. 2 is a view similar to FIG. 1 but with the hold-down member removed and the plunger disposed at the outer end of its path of travel.

FIG. 3 is an enlarged, fragmentary view showing the head in section and the outer end of the plunger in elevation; and

FIG. 4 is an inside view of the nozzle prior to mounting the same on the head.

A pump, broadly designated by the numeral **10**, is shown in FIGS. 1 and 2 attached to neck **12** of a fluid container **14**. The connection is releasable by virtue of the fact that pump **10** is attached to a cap **16** which is in turn screw-threaded onto the neck **12**.

Pump **10** includes a barrel **18**, a spring-loaded plunger **20** reciprocable in barrel **18**, and a discharge head **22** on the outer end of the plunger **20**. Barrel **18** progressively

decreases in diameter as a valve seat **24** is approached, seat **24** being within the barrel **18** near the inner end of the latter and being juxtaposed to a restricted opening **26** in barrel **18**. A tube (not shown) leading to the bottom of the container **14** is fitted into recess **28** at the inner end of barrel **18**, and such tube, therefore communicates with the opening **26**.

A retention member **30** forming a part of the barrel **18**, clamps a gasket **32** against the upper end of neck **12** and against an outwardly extending flange **34** integral with the barrel **18** therearound. It also clamps top face **36** of cap **16** against flange **34**.

Barrel **18** extends through an opening **38** in the top **36** of cap **16** and through the washer-type gasket **32**. The member **30** is press-fitted or otherwise tightly affixed to the barrel **18** to become a part thereof, and is provided with a central opening **40** within which the plunger **20** reciprocates. The outer face of the member **30** has a dish-shaped recess **42** terminating in a socket **44**, both of which surround the plunger, socket **44** having an annular, transversely sloping side wall as seen in FIG. 2.

Plunger **20** provides a tubular passage for fluid and is provided with an outwardly-facing shoulder **46** that engages member **30** as shown in FIG. 2, to limit the extent of outward movement of plunger **20** under influence of spring **48** that is housed within barrel **18** between plunger **20** and a spherical check valve **50** engageable with seat **24**. Spring **48** rests on wall **51** of barrel **18**, not on valve **50**, the inner convolution **53** of spring **48** limiting the extent of movement of floating valve **50** away from seat **24**. A tubular plug **52** attached to plunger **20** and extending into the inner end of the latter, receives the proximal end of the spring **48** and is provided with oppositely flaring, flexible wings **54** and **56** therearound that are in wiping engagement with the inner face of barrel **18**.

Head **22**, that is finger-actuated during use of the pump **10** to reciprocate the plunger **20**, is telescoped over the outer end of the plunger **20** and provided with a bore **58** therethrough that is appreciably larger in diameter than the outside diameter of a tubular reduced end portion **60** of the plunger **20** whereby the bore **58**, adjacent the portion **60**, is adapted to receive fluid from the plunger **20** when diaphragm **62** is unseated, as illustrated in FIG. 3.

The diaphragm **62** is in the nature of a thin membrane that partitions or closes off the upper end of the bore **58** and is preferably made as an integral part of the head **22**. Diaphragm valve **62** has a central disc-like portion **64** that is adapted to engage the outer end of the portion **60** of plunger **20** to block flow of fluid from plunger **20** to bore **58** as illustrated in FIG. 1.

To the end that the diaphragm **62** may be flexed toward and away from the proximal end of plunger **20** without stretching the material from which diaphragm **62** is made, there is provided an annulus **66** that is transversely undulated. Annulus **66**, which integrally interconnects the inner wall of head **22** that defines bore **58** with the portion **64** therearound, normally has substantially the shape of an inverted V, although if desired, the transverse shape of the annulus **66** might well be that of an upright V.

To this end, an outwardly-facing, annular, transversely V-shaped groove **68**, and a similarly shaped, inwardly-facing groove **70** are formed in the diaphragm **62**.

The distance between the outer end of plunger **20** and the diaphragm portion **64** when the latter is in its normal position as shown in FIG. 3, is determined by interengaging shoulders **72** between the head **22** and the plunger **20** and by the inner end of head **22** engaging shoulder **74** on plunger **20**. The said inner end of head **22** also seats against the bottom wall of socket **44** when the plunger **20** is depressed, as shown in FIG. 1. Further sealing at this point is provided by a bead **76** integral with head **22** at its innermost end in surrounding relationship thereto. The

bead 76 which is substantially semi-circular transversely thereof, also fits within the socket 44 rather tightly, deforming the flexible material from which the member 30 and the head 22 are made (see FIG. 1). The action is similar in nature therefore, to that provided by an O-ring seal.

Releasable means in the nature of a hold-down member 78 is attached to barrel 18 and particularly to the portion 30 thereof in any suitable manner such as by intermeshing screw threads as illustrated. While the member 78 chosen for illustration, is cup-shaped so as to enclose the head 22, such enclosure is not necessary and, therefore, the hold-down member 78 may take any desired form. However, it is necessary that the member 78 not only maintain the plunger 20 depressed, but that it maintain the parts 44—76 tightly sealed. Still further, the member 78 serves to deflect the diaphragm valve 62 and press the portion 64 thereof against the proximal end of plunger portion 60 by virtue of a pressure ear 80 integral with the top wall of member 78 and depending therefrom. Note in FIG. 1 that the ear 80 enters the bore 58 and engages the diaphragm portion 64 when the member 78 is attached to the portion 30 of barrel 18.

A laterally extending boss 82 on the head 22 is provided with a shallow, outwardly-facing cavity receiving a plate portion 86 of a discharge nozzle 88. The side wall of boss 82 defining the cavity therein is provided with an annular groove 90 surrounding the plate portion 86 and into which the latter is snap-fitted.

An inturned, annular rib 92 within the boss 82 separates the groove 90 from a dovetail-type of annular groove 94 within boss 82. An inwardly-extending band 96 integral with plate 86 complementally receives the rib 92 and is received by the groove 94 again by a snap-fit because of the resilient nature of the material from which head 22 and nozzle 88 are made.

Head 22 has an outlet port 98 placing the cavity of boss 82 into communication with bore 58, and particularly with an annular chamber 100 in boss 82 that is surrounded by the band 96 and covered by plate 86. The chamber 100 registers directly with a plurality of passages 102 in the inner face of plate 86 that are tangential to the band 96 and to a frusto-conical outlet aperture 104 in the plate 86 that terminates in a cylindrical hole 106.

When the pump 10 is to be placed in use, the hold-down member 78 is removed, whereupon an operator may reciprocate the plunger 20 in cooperation with spring 48 to force fluid such as a liquid insecticide, from the container 14, through the aperture 104. It is obvious that the valve 50 rises from seal 24 to admit the liquid into the plunger 20 when the latter is depressed, and bears against seat 24 to prevent passage of liquid back into container 14 when spring 48 forces plunger 20 to the position shown in FIG. 2, causing the liquid to flow into bore 58.

The fluid passes from the bore 58 and thence to the port 98 where it is equalized within the chamber 100 and flows to all of the passages 102 for discharge in an atomized uniform spray from the terminal end 106 of aperture 104. The pressure of the fluid within the chamber 100 acts radially outwardly on the band 96 of nozzle means 88 to press the band 96 tightly against the rib 92. Any fluid that tends to move inwardly in chamber 100, away from plate 86 along the band 96, also tends to hold the latter tightly within the groove 94. This action seals the member 88 and prevents leakage.

When the pump 10 is not in use, the member 78 is placed on the part 30 of barrel 18 and in so doing, there is a sealing action not only between the valve 62 and the portion 60 of plunger 20, but a sealing action between the bead 76 and the member 30 in socket 44.

Accordingly, the fluid cannot leak to the outside of the container 14 either from the outer end of plunger 20 or from between barrel portion 30 and plunger 20 at the opening 40. Furthermore, the member 78 prevents accidental reciprocation of plunger 20 and, therefore, discharge of the fluid during storage, shipment or other non-use of the pump 10.

This is a continuation-in-part of our copending application Serial No. 789,902, filed January 29, 1959, now abandoned.

Having thus described the invention what is claimed as new and desired to be secured by Letters Patent is:

1. In a fluid handling assembly, the combination of:
(*a*) a hollow pump barrel;
(*b*) member on the barrel;
(*c*) a plunger having conduit means therethrough, reciprocable in the barrel and extending through the member;
(*d*) a head mounted on the plunger above said member provided with a bore communicating with the conduit means of said plunger;
(*e*) a shiftable, biased, flexible diaphragm secured to the head and closing the normally uppermost end of the bore, the upper end of said plunger being open, being disposed within the bore, and being spaced below the diaphragm when the latter is in the normal position thereof permitting free flow of fluid into the bore through said open end of the plunger, said head having a fluid outlet port communicating with said bore;
(*f*) means on the plunger within the barrel for pumping fluid into the barrel, through the plunger, into said bore, and thense through said port upon reciprocation of the plunger;
(*g*) a hold-down elememt releasably attached to the member and having a top overylying the head when the element is attached to the member; and
(*h*) an ear depending from said top and against the diaphragm, holding the latter in a shifted position opposed to the bias and against said upper end of the plunger in complete fluid closing relationship therewith only when the element is attached to the member.

2. In a fluid handling assembly, the combination of:
(*a*) a hollow pump barrel;
(*b*) a member on the barrel;
(*c*) a plunger having conduit means therethrough, reciprocable in the barrel and extending through the member;
(*d*) a head above said member and provided with a bore;
(*e*) a shiftable, biased, flexible diphragm secured to the head and closing the normally uppermost end of the bore, said plunger extending into the opposite end of the bore and having a terminal portion within the bore of reduced outside diameter, presenting a space in the bore surrounding said portion, the upper end of said terminal portion being open and spaced below the diaprhagm when the latter is in the normal postion therof permitting free flow of fluid into the bore through said open end of the plunger, said head having a fluid outlet port communicating with said space;
(*f*) means on the plunger within the barrel for pumping fluid into the barrel, through the plunger, into said space, and thence through said port upon reciprocation of the plunger;
(*g*) a hold-down element releasably attached to the member and having a top wall overlying the head when the element is attached to the member; and
(*h*) an ear depending from said wall and against the diaphragm, holding the latter in a shifted position against said upper end of said terminal portion of the plunger in complete fluid closing relationship therewith only when the element is attached to the member.

3. In fluid handling assembly, the combination of:
(*a*) a hollow pump barrel;
(*b*) a member on the barrel;

(c) a plunger having conduit means therethrough, reciprocable in the barrel and extending through the member;

(d) a head above said member and provided with a bore;

(e) a shiftable, biased, flexible, generally flat diaphragm secured to the head and closing the normally uppermost end of the bore, said plunger being tightly fitted into the opposite end of the bore coaxially therewith and having a terminal portion within the bore of reduced outside diameter, presenting a space in the bore surrounding said portion, the upper end of said terminal portion being open and spaced below the diaphragm when the latter is in the normal position thereof permitting free flow of fluid into the bore through said open end of the plunger, said head having a fluid outlet port communicating with said space;

(f) means on the plunger within the barrel for pumping fluid into the barrel, through the plunger, into said space, and thence through said port upon reciprocation of the plunger;

(g) a hold-down element releasably attached to the member and having a top wall overlying the head with the element is attached to the member; and

(h) an ear integral with said wall and depending therefrom, said ear extending into the bore and against the diaphragm, holding the latter in a shifted position against said upper end of said terminal portion of the plunger in complete fluid closing relationship therewith only when the element is attached to the member.

4. In a fluid handling assembly, the combination of:

(a) a hollow pump barrel;

(b) a member on the barrel;

(c) a spring loaded plunger having conduit means therethrough, reciprocable in the barrel and extending through the member;

(d) a head above said member and provided with a bore;

(e) a shiftable, biased, flexible, generally flat diaphragm integral with the head and closing the normally uppermost end of the bore, said plunger being tightly fitted into the opposite end of the bore coaxially therewith and having a terminal portion within the bore of reduced outside diameter, presenting a space in the bore surrounding said portion, the upper end of said terminal portion being open and spaced below the diaphragm when the latter is in the normal position thereof permitting free flow of fluid into the bore through said open end of the plunger, said head having a laterally-extending, fluid outlet port communicating with said space;

(f) means on the plunger within the barrel for pumping fluid into the barrel, through the plunger, into said space, and thence through said port upon reciprocation of the plunger;

(g) a hollow, hold-down cover releasably attached to the member in surrounding relationship to the latter and in housing relationship to the head, said cover having a top wall overlying the head when the cover is on the member; and

(h) an ear integral with said wall within the cover and depending therefrom, said ear extending into the bore and against the diaphragm, holding the latter in a shifted position against said upper end of said terminal portion of the plunger in complete fluid closing relationship therewith only when the cover is on the member.

5. In a fluid handling assembly, the combination of:

(a) a hollow pump barrel;

(b) a member on the barrel;

(c) a spring-loaded plunger having conduit means therethrough, reciprocable in the barrel and extending through the member, said member having a normally uppermost face provided with a socket surrounding the plunger;

(d) a head above said face and provided with a bore;

(e) a shiftable, biased, flexible, generally flat diaphragm integral with the head and closing the normally uppermost end of the bore, said plunger being tightly fitted into the opposite end of the bore coaxially therewith and having a terminal portion within the bore of reduced outside diameter, presenting a space in the bore surrounding said portion, the upper end of said terminal portion being open and spaced below the diaphragm when the latter is in the normal position thereof permitting free flow of fluid into the bore through said open end of the plunger, said head having a laterally-extending, fluid outlet port communicating with said space;

(f) means on the plunger within the barrel for pumping fluid into the barrel, through the plunger, into said space, and thence through said port upon reciprocation of the plunger;

(g) a hollow, hold-down cover releasably attached to the member in surrounding relationship to the latter and in housing relationship to the head, said cover having a top wall overlying the head when the cover is on the member;

(h) an ear integral with said wall within the cover and depending therefrom, said ear extending into the bore and against the diaphragm, holding the latter in a shifted position against said upper end of said terminal portion of the plunger in fluid closing relationship therewith only when the cover is on the member; and

(i) a bead integral with the head in surrounding relationship thereto adjacent the lower end of the head, said cover operating through the ear in holding the plunger depressed and the bead seated in said socket to provide a seal against flow of fluid into the cover between the plunger and the member.

6. In a fluid handling assembly, the combination of:

(a) a hollow pump barrel;

(b) a member on the barrel;

(c) a spring-loaded plunger reciprocable in the barrel and extending through the member, said member having a normally uppermost face provided with a socket surrounding the plunger;

(d) a head above said face and provided with a bore;

(e) a shiftable, biased, flexible diaphragm secured to the head within the bore closing the normally uppermost end of the latter, said diaphragm having a central, disc portion and an annulus surrounding the disc portion and integrally joining the same with the head, said annulus being V-shaped in cross section, presenting continuous grooves in the outer and inner faces, respectively, of the diaphragm, said plunger being tightly fitted into the opposite end of the bore coaxially therewith and having a terminal portion within the bore of reduced outside diameter, presenting a space in the bore surrounding said portion, the upper end of said terminal portion being open and spaced below the diaphragm when the latter is in the normal position thereof permitting free flow of fluid into the bore through said open end of the plunger, said head having a laterally-extending, fluid outlet port communicating with said space;

(f) means on the plunger within the barrel for pumping fluid into the barrel, through the plunger, into said space, and thence through said port upon reciprocation of the plunger;

(g) a hollow, hold-down cover releasably attached to the member in surrounding relationship to the latter and in housing relationship to the head, said cover having a top wall overlying the head when the cover is on the member;

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(*h*) an ear integral with said wall within the cover and depending therefrom, said ear extending into the bore and against the disc portion of the diaphragm, holding the latter in a shifted position against said upper end of said terminal portion of the plunger in fluid closing relationship therewith only when the cover is on the member; and

(*i*) a bead integral with the head in surrounding relationship thereto adjacent the lower end of the head, said cover operating through the ear in holding the plunger depressed and the bead seated in said socket to provide a seal against flow of fluid into the cover between the plunger and the member.

7. In a fluid handling assembly, the combination of:

(*a*) a container cap provided with an opening;

(*b*) a hollow pump barrel extending through said opening;

(*c*) a retention member on the barrel, said barrel having means within the cap cooperating with said member to hold the cap attached to the barrel;

(*d*) a spring-loaded plunger having conduit means therethrough, reciprocable in the barrel and extending through the member, said member having a normally uppermost face provided with a socket surrounding the plunger;

(*e*) a head above said face and provided with a bore;

(*f*) a shiftable, biased, flexible diaphragm secured to the head within the bore closing the normally uppermost end of the latter, said diaphragm having a central, disc portion and an annulus surrounding the disc portion and integrally joining the same with the head, said annulus being V-shaped in cross section, presenting continuous grooves in the outer and inner faces, respectively, of the diaphragm, said plunger being tightly fitted into the opposite end of the bore coaxially therewith and having a terminal portion within the bore of reduced outside diameter, presenting a space in the bore surrounding said portion, the upper end of said terminal portion being open and spaced below the diphragm when the latter is in the normal position thereof permitting free flow of fluid into the bore through said open end of the plunger, said head having a laterally-extending, fluid outlet port communicating with said space;

(*g*) means on the plunger within the barrel for pumping fluid into the barrel, through the plunger, into said space, and thence through said port upon reciprocation of the plunger;

(*h*) a hollow, hold-down cover releasably attached to the member in surrounding relationship to the latter and in housing relationship to the head, said cover having a top wall overlying the head when the cover is on the member;

(*i*) an ear integral with said wall within the cover and depending therefrom, said ear extending into the bore and against the disc portion of the diaphragm, holding the latter in a shifted position against said upper end of said terminal portion of the plunger in fluid closing relationship therewith only when the cover is on the member; and

(*j*) a bead integral with the head in surrounding relationship thereto adjacent the lower end of the head, said cover operating through the ear in holding the plunger depressed and the bead seated in said socket to provide a seal against flow of fluid into the cover between the plunger and the member.

8. In a fluid handling assembly, the combination of:

(*a*) a fluid container having a neck;

(*b*) a cap mounted on said neck and provided with an opening;

(*c*) a hollow pump barrel in the container, coaxial with said neck and extending through said opening;

(*d*) a retention member on the barrel exteriorly of the container, said barrel having means within the cap cooperating with said member to hold the cap attached to the barrel;

(*e*) a spring-loaded plunger having conduit means therethrough, reciprocable in the barrel and extending through the member, said member having a normally uppermost face provided with a socket surrounding the plunger;

(*f*) a head above said face and provided with a bore;

(*g*) a shiftable, biased, flexible diaphragm secured to the head within the bore closing the normally uppermost end of the latter, said diaphragm having a central, disc portion and an annulus surrounding the disc portion and integrally joining the same with the head, said annulus being V-shaped in cross section, presenting continuous grooves in the outer and inner faces, respectively, of the diaphragm, said plunger being tightly fitted into the opposite end of the bore coaxially therewith and having a terminal portion within the bore of reduced outside diameter, presenting a space in the bore surrounding said portion, the upper end of said terminal portion being open and spaced below the diaphragm when the latter is in the normal position thereof permitting free flow of fluid into the bore through said open end of the plunger, said head having a laterally-extending, fluid outlet port communicating with said space;

(*h*) means on the plunger within the barrel for pumping fluid from the container, into the barrel, through the plunger, into said space, and thence through said port upon reciprocation of the plunger;

(*i*) a hollow, hold-down cover releasably attached to the member in surrounding relationship to the latter and in housing relationship to the head, said cover having a top wall overlying the head when the cover is on the member;

(*j*) an ear integral with said wall within the cover and depending therefrom, said ear extending into the bore and against the disc portion of the diaphragm, holding the latter in a shifted position against said upper end of said terminal portion of the plunger in fluid closing relationship therewith only when the cover is on the member; and

(*k*) a bead integral with the head in surrounding relationship thereto adjacent the lower end of the head, said cover operating through the ear in holding the plunger depressed and the bead seated in said socket to provide a seal against flow of fluid from the container into the cover between the plunger and the member.

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PLAINTIFF'S EXHIBIT AC

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835680	P. R. Div.		PATENT NUMBER 3064865
	Class 222	Subclass 321	DATED NOV 20 1962
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N, BAXTER I. JR. OF KANSAS CITY, MO.,
N, WOODROW E. OF INDEPENDENCE, MO.,

Number claims allowed	Print claim(s)	Class	Subclass
8	1	222	321

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APPLICATION Serial No.	Filed	APPLICATION Serial No.
		789,902
New Patent No.	Granted	Filed 1-29-59

Filing fee	Transaction	Atty's docket
$30	19635	8473

This is to certify that annexed hereto is a true copy from the records of the United States Patent Office of File Wrapper and Contents of the file identified above.

By authority of the
COMMISSIONER OF PATENTS

Certifying Officer

Date December 6, 1962

502

[1174] PLAINTIFF'S EXHIBIT AC.

(Page 1)

SPRAYER HEAD HAVING IMPROVED SEALING AND DISCHARGING MEANS

This invention relates to improvements in pumps or sprayers and particularly to that class of spraying attachments for containers commonly employed for example, in the dispensing of insecticides and other fluids, the primary object being to eliminate leakage problems when the pump or sprayer is not in use. Hand pumps of the kind used in small containers and utilizing a spring-loaded reciprocable plunger are prone to leak while in storage, and although the discharge head of the sprayer may be held depressed and enclosed within a cap, such improvement of itself does not prevent leakage into the cap.

It is the most important object of the present invention, therefore, to provide a valve that blocks the normal flow of the fluid to the outlet orifice of the discharge head whenever the plunger is held depressed at the inner end of its path of travel.

Another important object of the present invention is to provide a diaphragm valve in the nature of a flexible membrane that may be held closed while the pump plunger is depressed through use of a hold-down member that of itself, need not either house the discharge head or operate as a sealing means.

Another important object of the present invention is to eliminate leakage from between the plunger and the barrel of the pump within which the plunger is reciprocably mounted through the medium of a seal between

503

JOINT

APPLICATION FOR UNITED STATES PATENT

Oath, Power of Attorney, and Petition

Being duly sworn we, BAXTER I. SCOGGIN, JR. and WOODROW E. VAUGHAN, depose and say that we are respectively a citizen of the United States of America residing at 1223 West 66th Terrace Kansas City, Missouri and a citizen of the United States of America residing at 2000 South Leslie Independence, Missouri; that we have read the foregoing specification and claims and we verily believe we are the original, first, and joint inventors of the invention or discovery in SPRAYER HEAD HAVING IMPROVED SEALING AND DISCHARGING MEANS described and claimed therein; that we do not know and do not believe that this invention was ever known or used before our invention or discovery thereof, or patented or described in any printed publication in any country before our invention or discovery thereof, or more than one year prior to this application, or in public use or on sale in the United States for more than one year prior to this application; that this invention or discovery has not been patented in any country foreign to the United States on an application filed by us or our legal representatives or assigns more than twelve months before this application; and that no application for patent on this invention or discovery has been filed by us or our representatives or assigns in any country foreign to the United States, except as follows: No Exceptions

And we hereby appoint the firm of HOVEY, SCHMIDT, JOHNSON & HOVEY, 925 Grand Avenue, Kansas City 6, Missouri, Registration No. 19,349, attorneys with full power of substitution and revocation, to prosecute this application and to transact all business in the Patent Office connected therewith.

Wherefore we pray that Letters Patent be granted to us for the invention or discovery described and claimed in the foregoing specification and claims, and we hereby subscribe our names to the foregoing specification and claims, oath, power of attorney, and this petition, this 18th day of August, 1959.

Inventor: Baxter (First name) I. (Middle initial) Scoggin, Jr. (Last name)

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Inventor: Woodrow (First name) E. (Middle initial) Vaughan (Last name)

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State of Missouri }
County of Jackson } ss

Before me personally appeared BAXTER I. SCOGGIN, JR. and WOODROW E. VAUGHAN, to me known to be the persons described in the above application for patent, who signed the foregoing instrument in my presence, and made oath before me to the allegations set forth therein as being under oath, on the day and year aforesaid.

SEAL

Pat Remy Lanière
Notary Public
Jackson County, Missouri

My Commission expires April 9, 1963

This form may be executed only when attached to a complete application as the last page thereof.

Approved Single Signature Form

PLAINTIFF'S EXHIBIT AD

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EXHIBIT AD

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COMPLETED

789902 ✓ SERIAL NO. (Series of 1948)	P. R. Div.		PATENT NUMBER
Assistant examiner	Class 239 ✓	Subclass 321 ✓	DATED
Division No. 30 ✓	Filed complete (Date) JAN. 29. 1959 ✓	Serial No. 789 902	CLAIMS FOREIGN PRIORITY: Country / Date

Applicant(s)

SCOGGIN, BAXTER I. JR. OF KANSAS CITY, MO. ✓

VAUGHAN, WOODROW E. OF INDEPENDENCE, MO. ✓

Number claims allowed	Print claim	Class	Subclass
14 ✓	1 ✓	239 ✓	321 ✓

Assignee Cook Chemical Company, Kansas City, Mo., a corp. of Missouri.

Title of invention

PUMP-TYPE LIQUID SPRAYER HAVING SEALING MEANS ✓

☐ Division of ☐ Continuation of ☐ Substitute for abandoned APPLICATION Serial No. / Filed

☐ Continuation-in-part of APPLICATION Serial No. / Filed

Sh. drw.	Extra claims	Filing fee	Transaction	Atty's docket
1 ✓	✓	$30	82589	8236

New Patent No. / Granted

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EXAMINED AND PASSED FOR ISSUE

R. G. O'Leary (Primary Examiner) — 30 (Division)

NOTICE OF ALLOWANCE MAILED JAN 11 1961

[THIS SPACE RESERVED]

FINAL FEE

Date	Amount

505

[1177] PUMP-TYPE LIQUID SPRAYER HAVING SEALING MEANS

This invention relates to devices of the type employed for dispensing liquids from containers therefor and particularly to a spray-type hand pump removably mounted over the open top of a container, and constructed to discharge such liquid as a relatively fine spray during manual actuation of the pump.

The utilization of finger manipulated spray pumps to dispense various types of liquids such as insecticides from containers therefor, has been widely adopted because of the relatively inexpensive nature of such pumps and which are sold as a component part of the container itself. Generally, the pump includes a vertically reciprocable plunger extending upwardly beyond the top of the cap for the container and on which the pump is mounted, the pump being provided with a spray head or nozzle capable of forming a fine, mist-like spray of the liquid when the plunger is depressed by engagement with a finger-receiving saddle forming a part of the spray head.

Difficulties have been experienced in the utilization of the spray pumps as defined above and normally distributed mounted in place on the container, by virtue of the inherent nature of such pump structure to cause dispensing of the fluid upon accidental actuation of the plunger. One previously suggested solution to the problem consists of employing a hold-down member maintaining the plunger in its depressed condition and [1178] therefore inoperable during shipment and storage of the unit. However, leakage around the pump plunger hold-down member has occurred, since the only effective seal is normally between the lowermost portion of the hold-down member and the pump retainer forming a part of the dispensing device and secured to the barrel reciprocably carrying the spray head plunger.

It is, therefore, the most important object of the present invention to provide an efficient and inexpensive sealing member for a liquid dispensing pump of the type referred to above having a hold-down component or cap normally maintaining the plunger in its depressed condition and which sealing member prevents leaking of fluid from the con-

tainer, notwithstanding the disposition of the container during storage or shipment of the same.

A further important object of the invention is to provide a pump-type liquid sprayer having a novel sealing member therein presenting at least three separate sealed areas through which the liquid must pass before leaking from the hold-down component maintaining the plunger in its depressed condition.

An equally important object of the invention is to provide a sealing member of the aforementioned character which is adapted to be molded of one-piece construction and placed in operable position relative to the various components of the pump-type liquid sprayer during assembly of the same, whereby more effective sealing is provided during storage and shipment of the container and pump unit without materially increasing the overall cost of the assembly.

[1179] A further important aim of the invention is to provide a sealing member adapted to be disposed in a predetermined position within certain of the components of the pump-type liquid sprayer which prevents leakage of liquid from the container while the hold-down component is in operable position on the uppermost part of the sprayer and which automatically opens to permit liquid to pass from the spray unit after removal of the plunger hold-down component and actuation of the pump.

Also an important aim of the invention is to provide a sealing member which is adapted to be constructed of a material having a different coefficient of hardness from the remaining components of the liquid sprayer, whereby certain portions of the sealing member are deformed and thereby compressed upon complete assembly of the sprayer and with the plunger maintained in its depressed condition by the hold-down cap and an effective seal is provided under all storage and distribution conditions.

An additional important object of the invention is to provide a sealing member capable of maintaining the liquid within the reciprocable plunger and barrel therefor constituting a part of the pump, whereby liquid is prevented from passing into the hold-down cap maintaining the plunger within the barrel and at the lowermost end of its path of travel, this being important because hold-down

caps of the character described above are normally maintained in position by interengaged screw threads on such cap and a portion of the pump, it being recognized that the hold-down cap tends to become distorted when the [1180] same is tightly screwed on the retainer carrying the same and which distortion oftentimes permits liquid to leak from the liquid sprayer even though the plunger is in its depressed position.

Other important objects and details of the present liquid sprayer having a sealing member therein will become obvious or be explained more fully as the following specification progresses.

In the drawing:

Figure 1 is a fragmentary, vertical, cross-sectional view through a container having a liquid sprayer pump mounted thereon in operable position and with the pump plunger maintained in its depressed condition by a suitable hold-down cap housing the same and with the sealing member illustrated in its normal liquid-sealing position;

Fig. 2 is a fragmentary, vertical, cross-sectional view similar to Fig. 1 and illustrating the position of the plunger and spray head thereon after removal of the hold-down cap therefor;

Fig. 3 is an enlarged, front elevational view of the spray head of the present liquid spray device with certain components thereof removed to reveal details of construction of the same;

Fig. 4 is an enlarged, side elevational view of the sealing member adapted to be mounted in the spraying device, with certain portions thereof being in section and fragmentarily illustrating the relative disposition of the upper part of the spray head receiving the

508

JOINT

APPLICATION FOR UNITED STATES PATENT

Oath, Power of Attorney, and Petition

RECEIVED

FEB 26 1959

DIVISION 5 PAPER NO.

Being duly sworn we, BAXTER I. SCOGGIN, JR., WOODROW E. VAUGHAN, depose and say that we are respectively a citizen of the United States of America residing at 1223 West 60th Terrace, Kansas City, Missouri and a citizen of the United States of America residing at 2000 South Leslie, Independence, Missouri; that we have read the foregoing specification and claims and we verily believe we are the original, first, and joint inventors of the invention or discovery in PUMP-TYPE LIQUID SPRAYER HAVING SEALING MEANS described and claimed therein; that we do not know and do not believe that this invention was ever known or used before our invention or discovery thereof, or patented or described in any printed publication in any country before our invention or discovery thereof, or more than one year prior to this application, or in public use or on sale in the United States for more than one year prior to this application; that this invention or discovery has not been patented in any country foreign to the United States on an application filed by us or our legal representatives or assigns more than twelve months before this application; and that no application for patent on this invention or discovery has been filed by us or our representatives or assigns in any country foreign to the United States, except as follows: No exceptions

And we hereby appoint C. KARL HOVEY of Federal Reserve Bank Building, 925 Grand Avenue, Kansas City 6, Missouri, Registration No. 11,801, our attorney with full power of substitution and revocation, to prosecute this application and to transact all business in the Patent Office connected therewith.

Wherefore we pray that Letters Patent be granted to us for the invention or discovery described and claimed in the foregoing specification and claims, and we hereby subscribe our names to the foregoing specification and claims, oath, power of attorney, and this petition, this 21st day of January, 1959.

Inventor: Baxter (First name) I. (Middle initial) Scoggin, Jr. (Last name)

Post Office Address: 1223 West 60th Terrace, Kansas City, Missouri

Inventor: Woodrow (First name) E. (Middle initial) Vaughan (Last name)

Post Office Address: 2000 South Leslie, Independence, Missouri

State of MISSOURI
County of JACKSON } ss

Before me personally appeared BAXTER I. SCOGGIN, JR. and WOODROW E. VAUGHAN, to me known to be the persons described in the above application for patent, who signed the foregoing instrument in my presence, and made oath before me to the allegations set forth therein as being under oath, on the day and year aforesaid.

Notary Public

SEAL

My Commission Expires: Dec. 19, 1961

This form may be executed only when attached to a complete application as the last page thereof.

Approved Single Signature Form
Joint Inventors

509

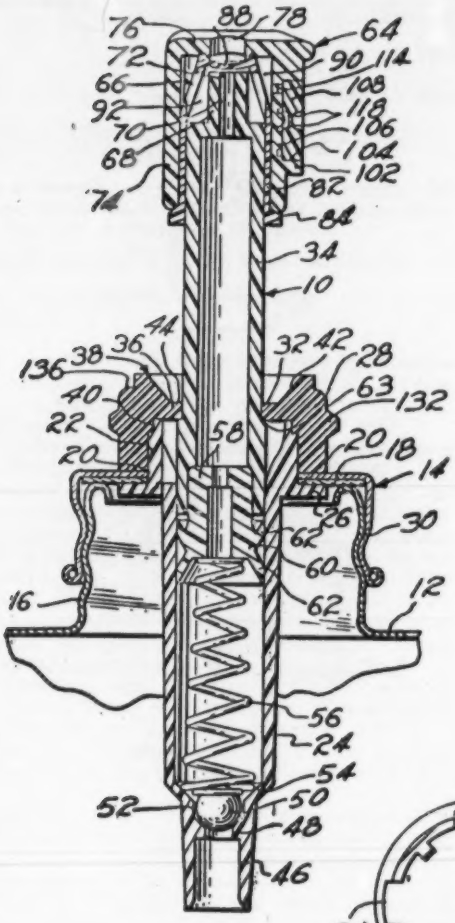


Fig. 2.

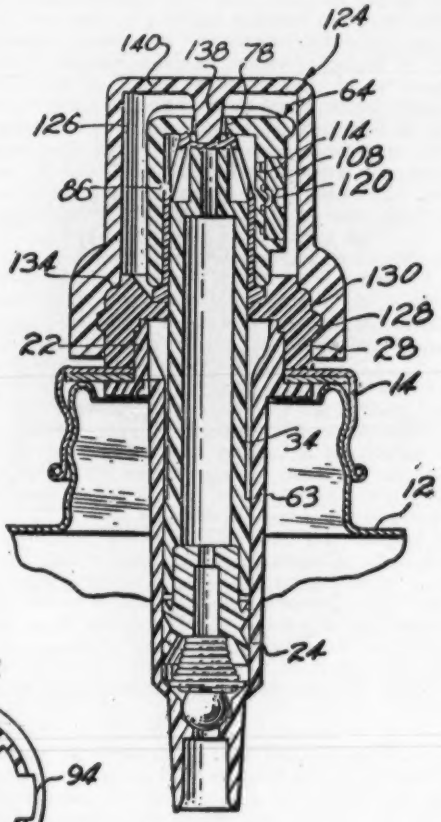


Fig. 1.

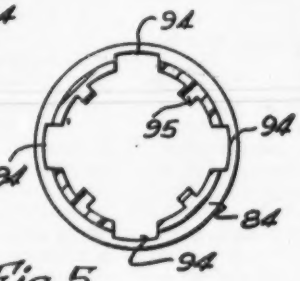


Fig. 5.

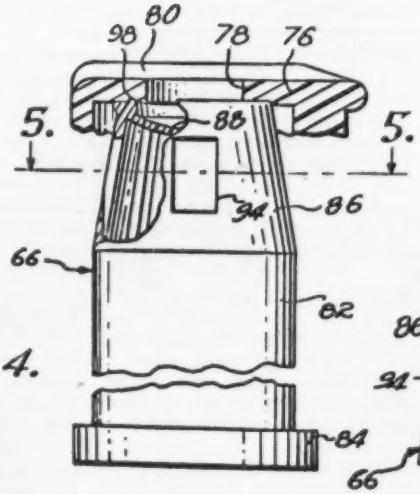


Fig. 4.

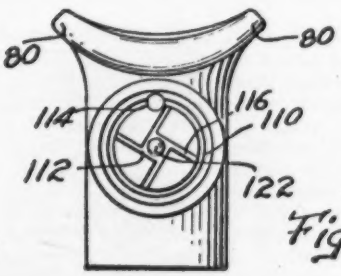


Fig. 3.

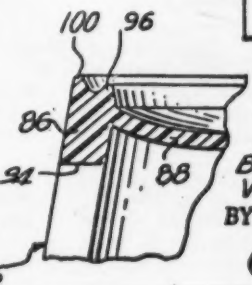


Fig. 6.

INVENTORS.
Boxter I. Scoggin Jr.
Woodrow E. Vaughan
BY
ATTORNEY

DEFENDANT'S EXHIBIT 10

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Jan. 27, 1959 B. I. SCOGGIN, JR 2,870,943

PUMP-TYPE LIQUID SPRAYER HAVING HOLD-DOWN CAP

Filed March 4, 1957

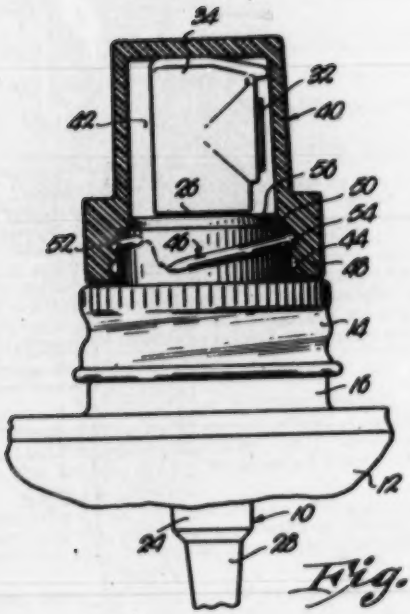


Fig. 1.

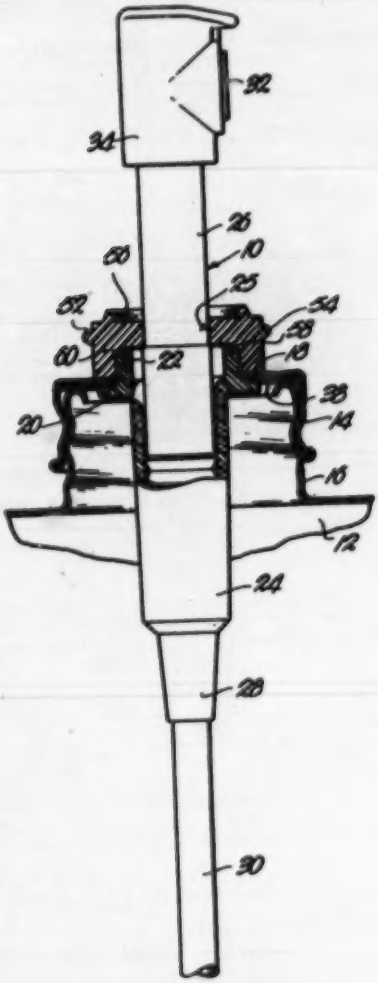


Fig. 2.

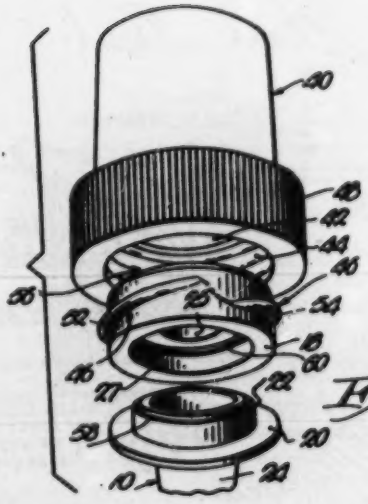


Fig. 3.

INVENTOR.
Baxter I. Scoggin
BY
ATTORNEY

United States Patent Office 2,870,943
Patented Jan. 27, 1959

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2,870,943

PUMP-TYPE LIQUID SPRAYER HAVING HOLD-DOWN CAP

Baxter L. Scoggin, Jr., Kansas City, Mo., assignor, by mesne assignments, to Cook Chemical Company, Kansas City, Mo., a corporation of Missouri

Application March 4, 1957, Serial No. 643,711

4 Claims. (Cl. 222—182)

This invention relates to improvements in structures for dispensing liquids wherein is provided a spray-type hand pump mounted within a container for the liquid through use of the closure cap of such container.

It is common practice, as exemplified for example by Patent No. 2,362,080, issued November 7, 1944, to dispense various types of liquids such as insecticides, through use of a finger-manipulated spray pump normally sold as a component part of the container itself. The pump includes a vertically reciprocable plunger extending upwardly beyond the top of the cap within which the pump is mounted and provided with a spray head or nozzle structure capable of emitting a fine mist-like spray when the plunger is depressed by engagement with a finger-receiving saddle forming a part of the spray head.

Difficulties have been experienced in the field by virtue of the inherent nature of such structure since accidental actuation of the plunger causes dispensing of the fluid and oftentimes the material is used in part by store employees prior to sale because of the ready accessibility to the pump itself.

It is the most important object of the present invention, therefore, to provide structure for rendering the pump inoperable during shipment and while in storage, as well as on the shelves of the retail dealer.

Another important object of the present invention is to provide structure capable of carrying out the functions above set forth which is also adapted to enclose the head of the plunger and thereby protect the same, as well as handlers of the merchandise by virtue of the fact that the said plunger is completely enclosed and held at the innermost end of its reciprocable path of travel.

A further object of the instant invention is to provide a hold-down cap that may be quickly and easily applied and removed by virtue of a releasable attachment to a part of the entire unit such as by use of screw-threaded interengagement therewith.

A further object of this invention is to provide improvements of the aforementioned character that advantageously employs a part of the unit which has a secondary function of attaching the barrel of the spray pump to the closure cap of the container.

Other objects include important details of construction to be made clear or become apparent as the following specification progresses, reference being had to the accompanying drawing, wherein:

Figure 1 is a fragmentary, elevational view of a liquid container showing a pump-type sprayer as a part thereof and including the novel hold-down cap of the instant invention, parts being in section for clearness.

Fig. 2 is a fragmentary, vertical, cross-sectional view through the container and its cap showing the pump assembly in its operable position with the hold-down cap removed; and

Fig. 3 is an exploded perspective view showing the hold-down cap and certain parts of the sprayer with which the same is operably associated.

Pump-type sprayer 10 for liquid container 12 is attached to cap 14 for retention thereby when cap 14 is removed from threaded neck 16 of container 12, and if desired, there may be provided sufficient clearance between cup-shaped retainer 18 and annular outturned flange 20 to permit rotation of cap 14 relative to sprayer 10.

Both cap or closure 14 and retainer 18 are received by a cylindrical extension 22 of frusto-conical barrel 24, forming a part of the sprayer 10, extension 22 being integral with flange 20 at the innermost edge of the latter. Flange 20 is integral with barrel 24 near the larger, uppermost edge of the latter and is held against the under side of gasket 38 in the cap 14 when the sprayer 10 is operably associated with container 12.

Retainer 18 is provided with a central opening 25 which receives tubular plunger 26 and has a cavity 27 that accommodates the enlarged extension 22 as is clear in Fig. 2. Retainer 18 is fitted tightly over the extension 22 and maintains the retainer in place with flange 20 against gasket 38 as above set forth.

Reduced end 28 of barrel 24 receives a tube 30 that extends to the bottom of container 12, it being understood that the sprayer 10 is internally constructed in a suitable manner as, for example, in accordance with teachings of the aforementioned patent to pump liquid from the container 12 into the tube 30 and thence through nozzle 32 forming a part of a spray head 34 secured to the uppermost end of plunger 26. The enlarged head 34 is normally depressed by one finger as the operator grasps the container 12 as is well understood in this art.

Cap 14 has a clearance opening therein, as best shown in Fig. 2, for the extension 22 of barrel 24 and when the cap 14 is in screw-threaded engagement with neck 16, the gasket 38 which surrounds barrel 24, is clamped tightly between flange 20 and the under side of the top of cap 14.

A hold-down member broadly designated by the numeral 40, is provided to hold the plunger 26 at the lowermost end of its path of travel within the barrel 24 in the manner illustrated by Fig. 1, it being understood as by reference to said patent, that a spring (not shown) within the barrel 24, yieldably biases the plunger 26 upwardly to the position shown in Fig. 2. The hold-down member 40 is preferably in the nature of a hollow cap so that the same not only encloses or houses the upper end of plunger 26, i. e. spray head 34, but releasably attaches to the retainer 18 and also houses the latter.

A cylindrical bore 42 within the hold-down cap 40 receives the head 34 as seen in Fig. 1, and enlargement of the bore 42 adjacent the lowermost open end of the cap 40 is provided with internal screw threads 44 that mesh with external screw threads 46 on the retainer 18, thereby releasably attaching the cap 40 to the retainer 18.

An enlarged, annular boss 48 on the cap 40 is provided with a ribbed, outermost surface to facilitate mounting and removal of the cap 40 relative to retainer 18. A downwardly-facing shoulder 50 within the cap 40 engages the upper surface of retainer 18, thereby preventing engagement between cap 40 and closure 14 to prevent forcing of the retainer 18 from its tight press-fit engagement with extension 22. As illustrated, the screw threads 46 on the retainer 18 are in the nature of a pair of substantially semi-circular, spirally arranged sections 52 and 54, permitting molding of the retainer 18 with its screw threads 46 as a single unitary part.

In addition to the seal provided between shoulder 50 and the top surface of retainer 18, there is established an additional annular seal between annular rib 56 and the annular surface of cap 40 immediately adjacent to shoulder 50. This seal is clearly illustrated in Figure 1. The cross-sectional contour of rib 56 is as shown

512

in Fig. 2 to present an upwardly and inwardly inclined annular face which snugly fits against the "corner" or line of juncture between shoulder 50 and the adjacent annular inner face of cap 40.

The interfitting surfaces between extension 22 and retainer 18 are as illustrated in Fig. 2. There is an annular notch formed in extension 22 at the outer extremity thereof and this notch 58 receives a similarly formed, continuous annular projection 60 formed integrally with retainer 18 and at a point where elements 58 and 60 will interlock when the parts are in assembled condition.

Thus, any accidental leakage or seepage from container 12 through the parts after they are assembled is obviated.

The material from which retainer 18 is produced is soft enough to be slightly compressed when shoulder 50 and the corner adjacent thereto, rides along the upwardly and inwardly inclined outer face of rib 56 when cap 40 is moved to position.

Having thus described the invention what is claimed as new and desired to be secured by Letters Patent is:

1. In a closure assembly for an open-top container having a perforated cap over said open top thereof mounting a spray unit including a barrel provided with a tubular extension passing coaxially upwardly through the perforation in said cap, a plunger reciprocably carried by the barrel and normally extending therebeyond and a spray head on the upper end of the plunger above said extension, the combination with said spray unit of an annular retainer telescoped over and secured to the extension above said cap and provided with external, circumferentially disposed screw threads and an annular, continuous segment at the upper part of the retainer above said screw threads, and a cup-shaped hold-down member housing the head and holding the plunger depressed at substantially the innermost path of travel thereof within the barrel, said member being provided with internal screw threads complementally engaging said screw threads on the retainer and having an internal, circumferentially extending, continuous shoulder disposed to engage said segment around the entire periphery thereof and thereby present a liquid-tight seal located between the spray head and said threads on the retainer and said member respectively, said shoulder being spaced from the lower annular peripheral edge of the member a distance at least slightly less than the distance from that portion of said segment normally engaged by said shoulder, to the proximal upper surface of the cap whereby said lower edge of the member is maintained out of contacting relationship with the cap when the member is on the retainer in a position with said shoulder in tight sealing engagement with the segment.

2. A closure assembly as set forth in claim 1 wherein one of the normally interengaged surfaces of the shoulder and segment respectively is substantially conical to present an inclined annular face coaxial with the member and said retainer and of sufficient diameter at the largest end thereof to cause the seal effected between the shoulder and said segment to become tighter as the shoulder slides on said segment during shifting of the member toward the cap.

3. A closure assembly as set forth in claim 2 wherein said retainer is provided with a continuous, annular rib integral with the normally upper edge thereof and defining said segment, said rib having an outwardly facing, inclined surface presenting said conical face and of greatest external diameter at the zone of juncture of the rib with the retainer, said member having a pair of inner, coaxial, longitudinally spaced, cylindrical surfaces, the innermost cylindrical surface having a smaller diameter than the outermost cylindrical surface and presenting said shoulder therebetween lying in a plane perpendicular to the axes of said cylindrical surfaces, the diameter of said innermost cylindrical surface of the member being intermediate the diameters of opposed external end margins of said rib.

4. A closure assembly as set forth in claim 3 wherein the member and retainer are constructed of materials having different coefficients of hardness whereby one of the interengaged faces of the rib and said shoulder respectively is deformed as the member is shifted toward the cap to thereby produce a more effective seal therebetween.

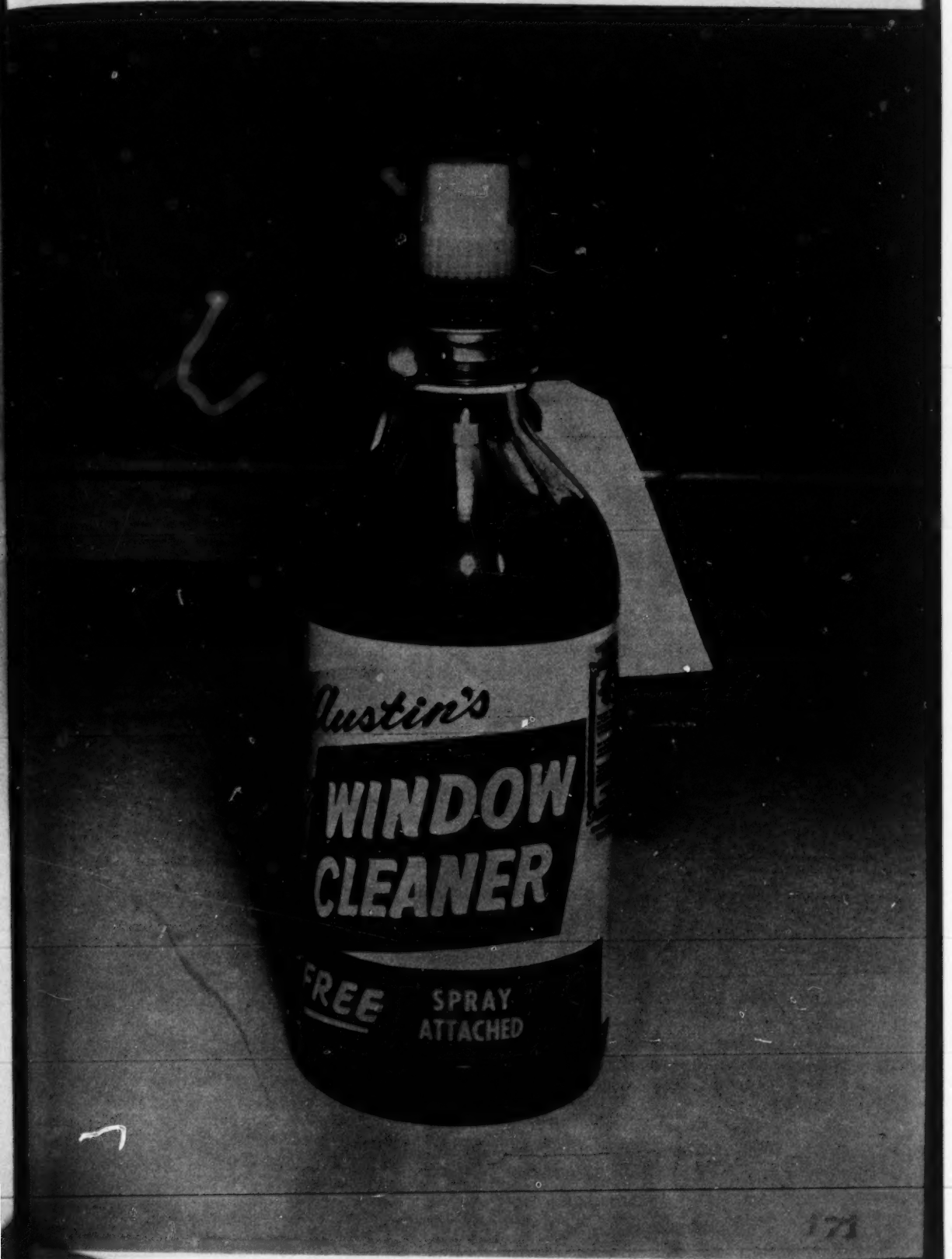
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DEFENDANT'S EXHIBIT 31

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DEFENDANT'S EXHIBIT 31-A

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DEFENDANT'S EXHIBIT 33

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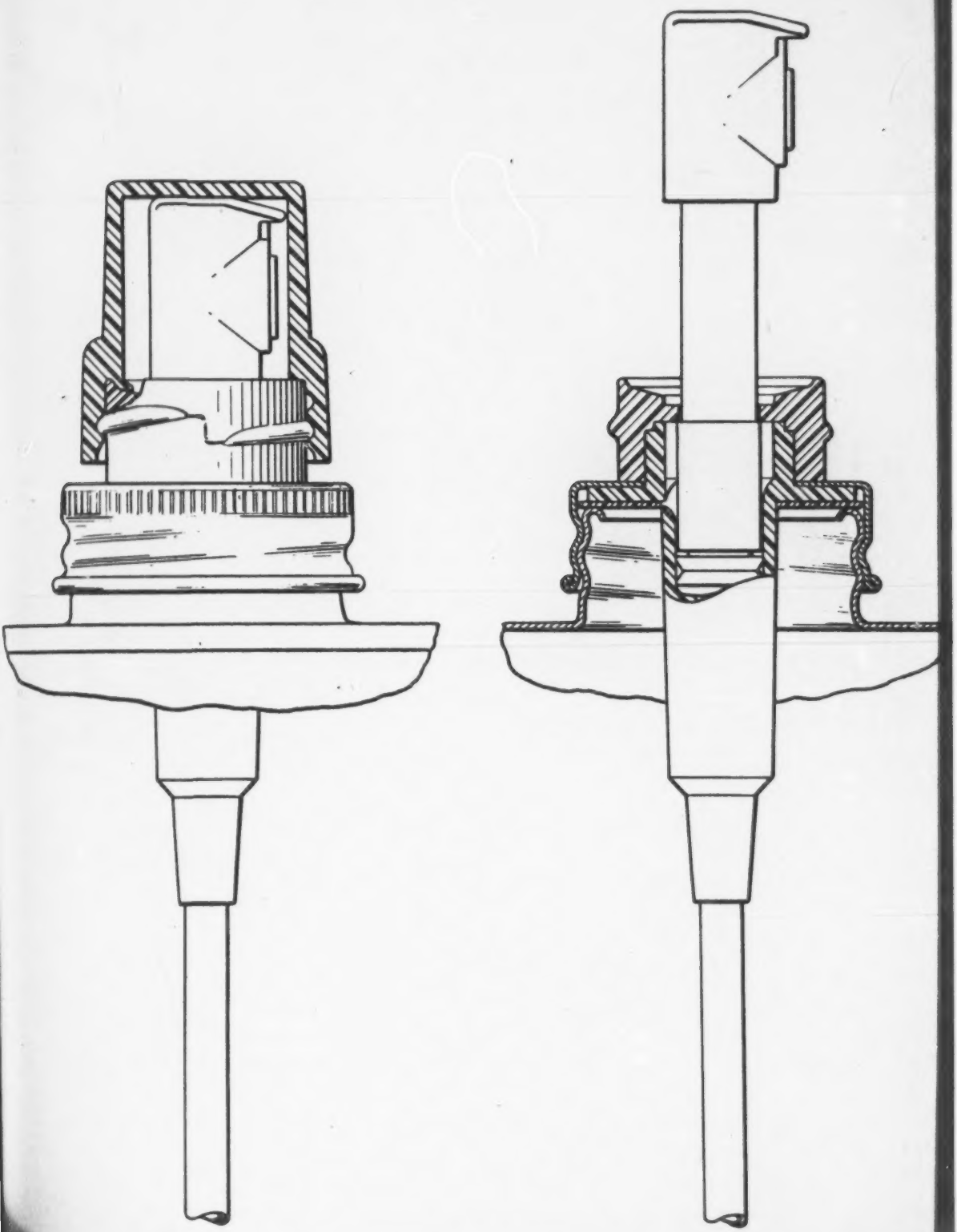
[1189] DEFENDANT'S EXHIBIT 35.

WINDOW CLEANER

	1956 1957	1957 1958	1958 1959	1959 1960	1960 1961	1961 1962
June	92	53	57	881	987	1980
July	35	41	53	865	686	1171
August	103	100	16	836	974	965
September	35	23	95	766	1037	998
October	77	61	2728	1073	1152	1402
November	92	67	1588	858	1098	1591
December	51	25	618	953	1115	1086
SUB-TOTAL	485	370	5155	6232	7049	9193
January	50	85	560	816	1006	1086
February	54	47	878	1086	569	
March	78	44	1073	945	1546	
April	28	88	2588	1659	1283	
May	117	75	1539	1533	1329	
TOTAL	812	709	11793	12271	12782	

DEFENDANT'S EXHIBIT 90

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#1

SCOGGIN, JR.
PATENT-IN-SUIT
2,870,943
1957-1959

Fig. 1.

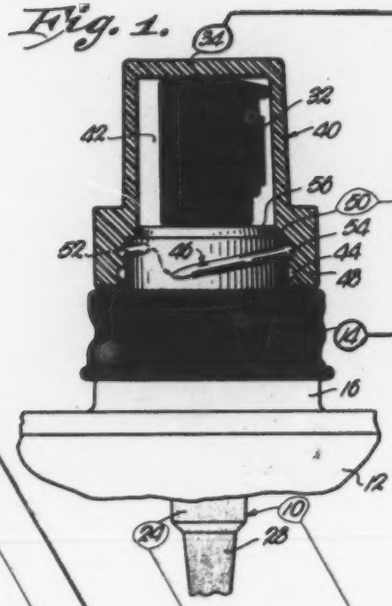


Fig. 2.

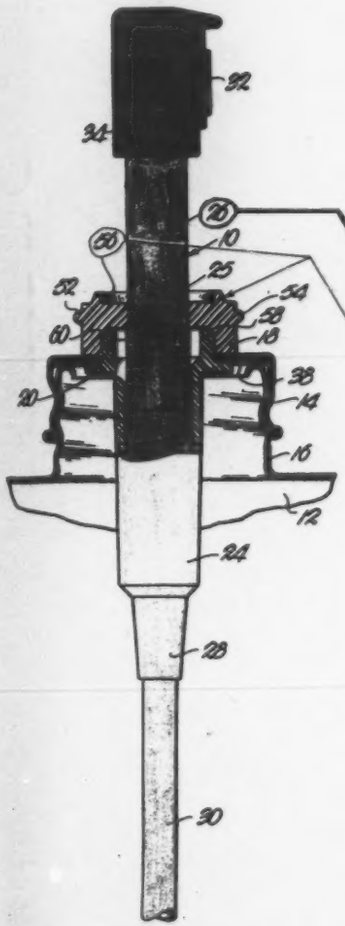
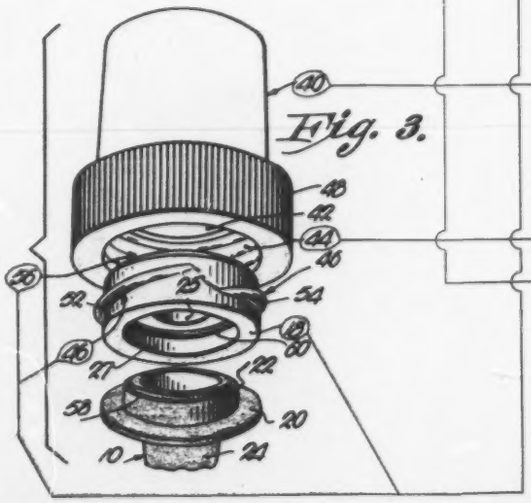


Fig. 3.



CLOSURE ASSEMBLY for LIQUID CONTAINER 12 (Colored Yellow)

CAP 14 (Colored Red)

SPRAYER 10 including BARREL 24 (Colored Flesh)

TUBULAR PLUNGER 26 (Colored Orange)

SPRAY HEAD 34 (Colored Brown)

RETAINER 18 (Colored Green) having SCREW THREADS 46 and ANNULAR RIB 56

HOLD DOWN MEMBER 48 (Colored Blue)

INTERNAL SCREW THREADS 44 (Colored Blue)

DOWNWARDLY FACING SHOULDER 58 (Colored Blue)

ANNULAR RIB 56 (Colored Green) has INCLINED OUTER ANNULAR FACE

ELEMENT NO.	MECHANICAL ELEMENTS OF SCOGGIN, JR. PATENT 2,870,943 As Described In	
	CLAIM 1	CLAIM 2
INTRODUCTION A	IN A CLOSURE ASSEMBLY FOR AN OPEN-TOP CONTAINER HAVING	failure claims 5 in more covering many types of seals
B	A PERFORATED CAP OVER SAID OPEN TOP THEREOF MOUNTING	
C	A SPRAY UNIT INCLUDING A BARREL PROVIDED WITH A TUBULAR EXTENSION PASSING COAXIALLY UPWARDLY THROUGH THE PERFORATION IN SAID CAP,	
D	A PLUNGER RECIPROCABLY CARRIED BY THE BARREL AND NORMALLY EXTENDING THEREBEYOND AND	
E	A SPRAY HEAD ON THE UPPER END OF THE PLUNGER ABOVE SAID EXTENSION,	
1	THE COMBINATION WITH SAID SPRAY UNIT OF AN ANNULAR RETAINER TELESCOPED OVER AND SECURED TO THE EXTENSION ABOVE SAID CAP AND PROVIDED WITH EXTERNAL, CIRCUMFERENTIALLY DISPOSED SCREW THREADS AND AN ANNULAR, CONTINUOUS SEGMENT AT THE UPPER PART OF THE RETAINER ABOVE SAID SCREW THREADS, AND	A CLOSURE ASSEMBLY AS SET FORTH IN CLAIM 1 WHEREIN
2	A CUP-SHAPED HOLD-DOWN MEMBER HOUSING THE HEAD AND HOLDING THE PLUNGER DEPRESSED AT SUBSTANTIALLY THE INNERMOST PATH OF TRAVEL THEREOF WITHIN THE BARREL, SAID MEMBER BEING PROVIDED WITH	
3	INTERNAL SCREW THREADS COMPLEMENTALLY ENGAGING SAID SCREW THREADS ON THE RETAINER AND HAVING	
4	AN INTERNAL, CIRCUMFERENTIALLY EXTENDING, CONTINUOUS SHOULDER DISPOSED TO ENGAGE SAID SEGMENT AROUND THE ENTIRE PERIPHERY THEREOF AND THEREBY PRESENT A LIQUID-TIGHT SEAL LOCATED BETWEEN THE SPRAY HEAD AND SAID THREADS ON THE RETAINER AND SAID MEMBER RESPECTIVELY, SAID SHOULDER BEING SPACED FROM THE LOWER ANNULAR PERIPHERAL EDGE OF THE MEMBER A DISTANCE AT LEAST SLIGHTLY LESS THAN THE DISTANCE FROM THAT PORTION OF SAID SEGMENT NORMALLY ENGAGED BY SAID SHOULDER, TO THE PROXIMAL UPPER SURFACE OF THE CAP WHEREBY SAID LOWER EDGE OF THE MEMBER IS MAINTAINED OUT OF CONTACTING RELATIONSHIP WITH THE CAP WHEN THE MEMBER IS ON THE RETAINER IN A POSITION WITH SAID SHOULDER IN TIGHT SEALING ENGAGEMENT WITH THE SEGMENT.	shoulder is "structure" not a surface merely
5		ONE OF THE NORMALLY INTERENGAGED SURFACES OF THE SHOULDER AND SEGMENT RESPECTIVELY IS SUBSTANTIALLY CONICAL TO PRESENT AN INCLINED ANNULAR FACE COAXIAL WITH THE MEMBER AND SAID RETAINER AND OF SUFFICIENT DIAMETER AT THE LARGEST END THEREOF TO CAUSE THE SEAL EFFECTED BETWEEN THE SHOULDER AND SAID SEGMENT TO BECOME TIGHTER AS THE SHOULDER SLIDES ON SAID SEGMENT DURING SHIFTING OF THE MEMBER TOWARD THE CAP.

DEFENDANT'S EXHIBIT 110

521



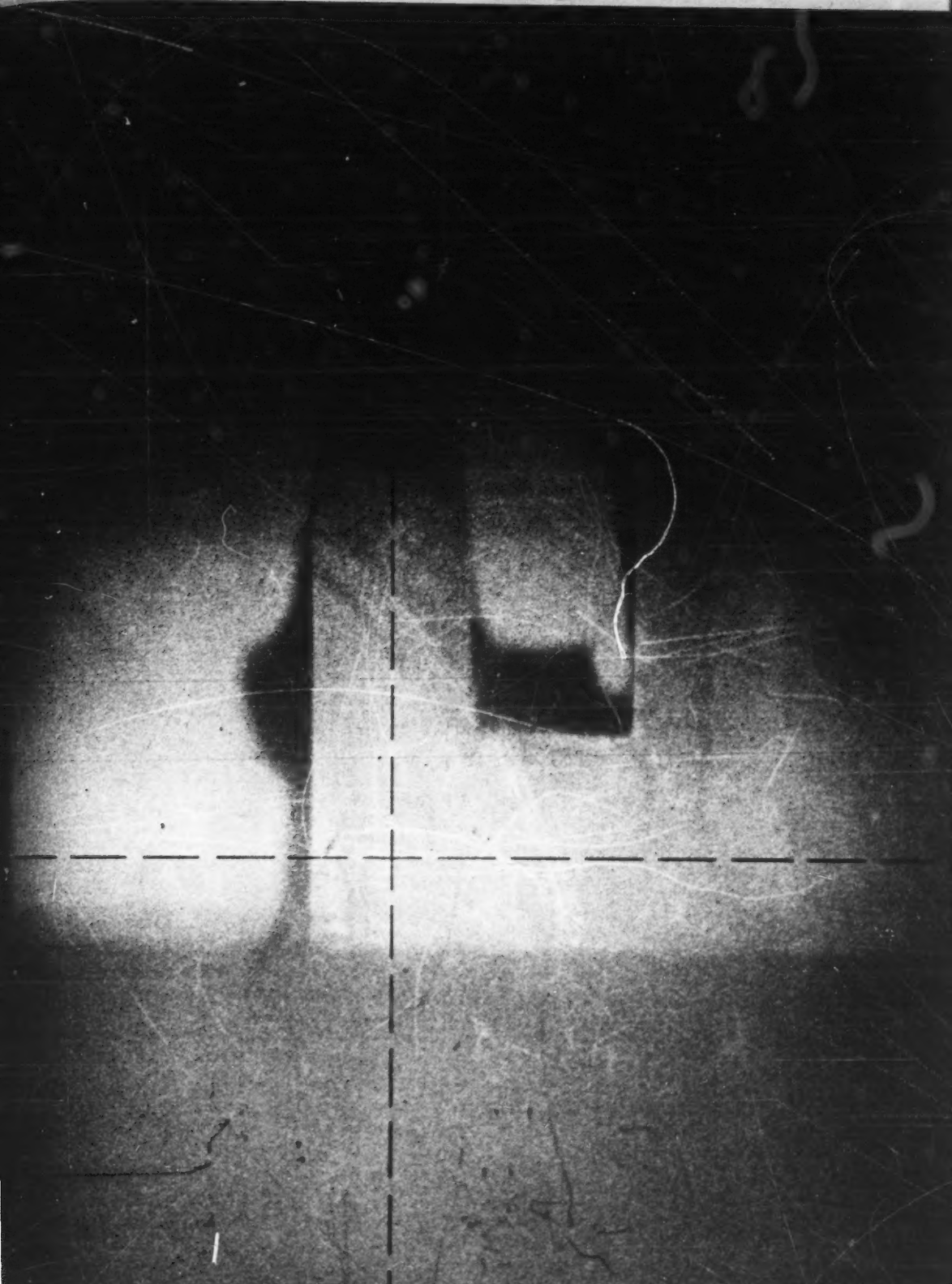
DEFENDANT'S EXHIBIT 112

522



DEFENDANT'S EXHIBIT 114

523



DEFENDANT'S EXHIBIT 116

524



DEFENDANT'S EXHIBIT 118

525

DRAWINGS SHOWING

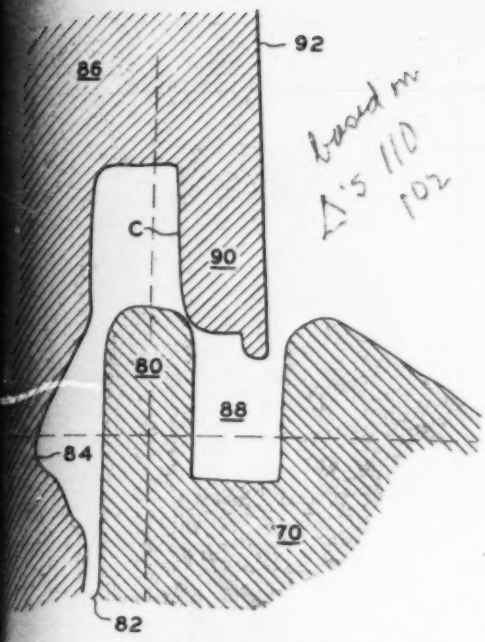
VARIOUS STAGES IN ASSEMBLY

OF

CALMAR COVER CAP ON COLLAR

BASED ON

PHOTOMICROGRAPHS OF SECTIONED SAMPLES



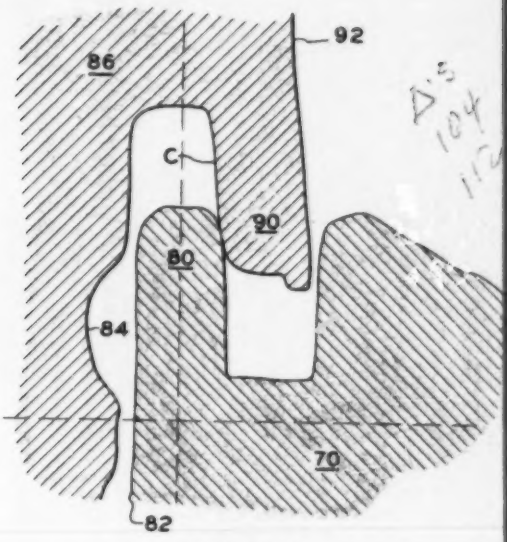
based on Δ's 110 102

STAGE 1

PRIOR TO CONTACT

of

SEALING RING 90 & WALL 80



Δ's 104 112

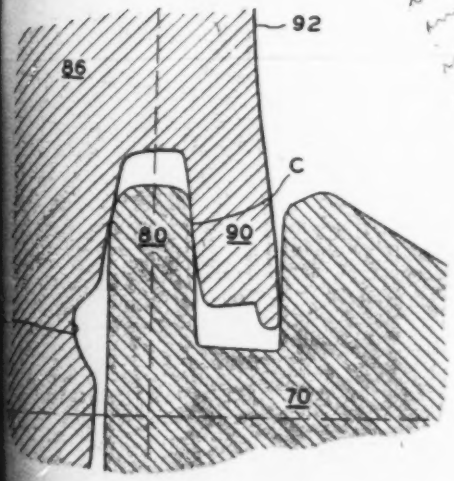
STAGE 2

INITIAL CONTACT

of

SEALING RING 90 & WALL 80

would improvement with straight



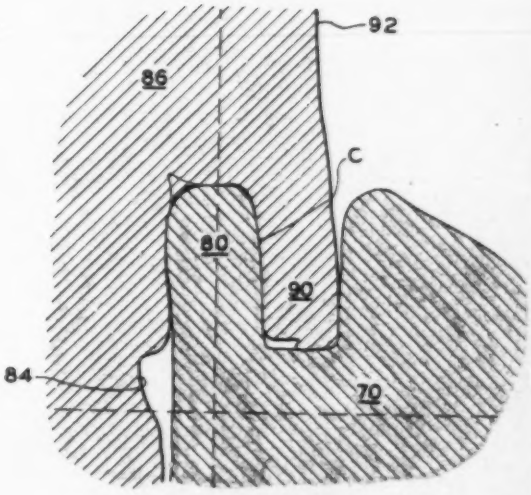
Δ's 106 114

STAGE 3

INTERMEDIATE POSITION

of

SEALING RING 90 & WALL 80



STAGE 4

COMPLETED ASSEMBLY

of

SEALING RING 90 & WALL 80

CHART SHOWING WHEREIN

MECHANICAL ELEMENTS OF CLAIMS 1 & 2 OF SCOGGIN, JR. PATENT 2,870,943 ARE FOUND IN ACCUSED DEVICE

SCOGGIN, JR.
PATENT-IN-SUIT
2,870,943
1957-1959

Fig. 1.

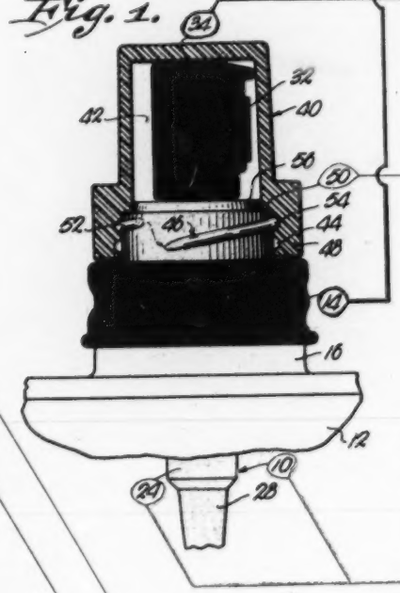


Fig. 2.

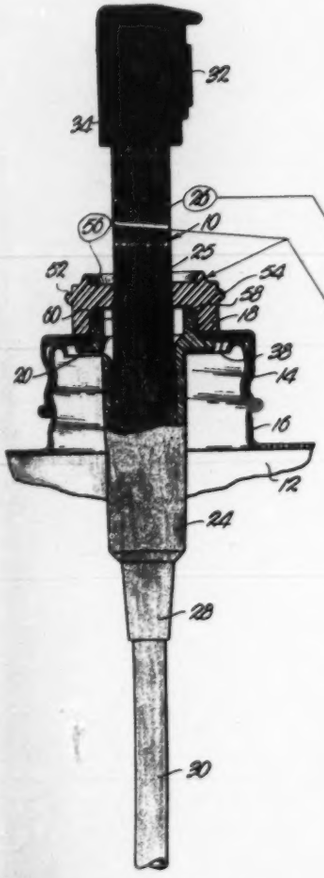
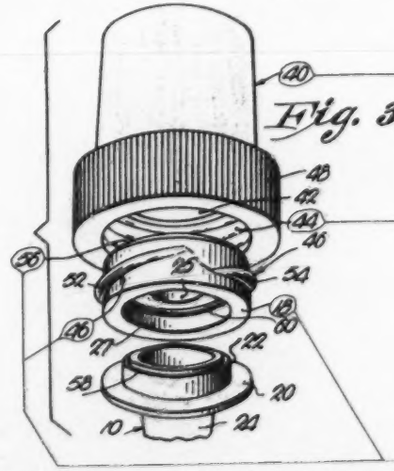


Fig. 3.



CLOSURE ASSEMBLY for LIQUID CONTAINER 12 (Colored Yellow)

CAP 14 (Colored Red)

SPRAYER 10 including BARREL 24 (Colored Flesh)

TUBULAR PLUNGER 28 (Colored Orange)

SPRAY HEAD 34 (Colored Brown)

RETAINER 18 (Colored Green) having SCREW THREADS 46 and ANNULAR RIB 56

HOLD DOWN MEMBER 40 (Colored Blue)

INTERNAL SCREW THREADS 44 (Colored Blue)

DOWNWARDLY FACING SHOULDER 50 (Colored Blue)

ANNULAR RIB 56 (Colored Green) has INCLINED OUTER ANNULAR FACE

ELEMENT NO.	MECHANICAL ELEMENTS OF SCOGGIN, JR. PATENT 2,870,943 As Described In		IS ELEMENT FOUND IN CALMAR DEVICE?
	CLAIM 1	CLAIM 2	
INTRODUCTION A	IN A CLOSURE ASSEMBLY FOR AN OPEN-TOP CONTAINER HAVING		YES
B	A PERFORATED CAP OVER SAID OPEN TOP THEREOF MOUNTING		YES
C	A SPRAY UNIT INCLUDING A BARREL PROVIDED WITH A TUBULAR EXTENSION PASSING COAXIALLY UPWARDLY THROUGH THE PERFORATION IN SAID CAP,		YES
D	A PLUNGER RECIPROCABLY CARRIED BY THE BARREL AND NORMALLY EXTENDING THEREBEYOND AND		YES
E	A SPRAY HEAD ON THE UPPER END OF THE PLUNGER ABOVE SAID EXTENSION,		YES
1	THE COMBINATION WITH SAID SPRAY UNIT OF AN ANNULAR RETAINER TELESCOPED OVER AND SECURED TO THE EXTENSION ABOVE SAID CAP AND PROVIDED WITH EXTERNAL, CIRCUMFERENTIALLY DISPOSED SCREW THREADS AND AN ANNULAR, CONTINUOUS SEGMENT AT THE UPPER PART OF THE RETAINER ABOVE SAID SCREW THREADS, AND	A CLOSURE ASSEMBLY AS SET FORTH IN CLAIM 1 WHEREIN	YES
2	A CUP-SHAPED HOLD-DOWN MEMBER HOUSING THE HEAD AND HOLDING THE PLUNGER DEPRESSED AT SUBSTANTIALLY THE INNERMOST PATH OF TRAVEL THEREOF WITHIN THE BARREL, SAID MEMBER BEING PROVIDED WITH		YES
3	INTERNAL SCREW THREADS COMPLEMENTALLY ENGAGING SAID SCREW THREADS ON THE RETAINER AND HAVING		YES
4	AN INTERNAL, CIRCUMFERENTIALLY EXTENDING, CONTINUOUS SHOULDER DISPOSED TO ENGAGE SAID SEGMENT AROUND THE ENTIRE PERIPHERY THEREOF AND THEREBY PRESENT A LIQUID-TIGHT SEAL LOCATED BETWEEN THE SPRAY HEAD AND SAID THREADS ON THE RETAINER AND SAID MEMBER RESPECTIVELY, SAID SHOULDER BEING SPACED FROM THE LOWER ANNULAR PERIPHERAL EDGE OF THE MEMBER A DISTANCE AT LEAST SLIGHTLY LESS THAN THE DISTANCE FROM THAT PORTION OF SAID SEGMENT NORMALLY ENGAGED BY SAID SHOULDER, TO THE PROXIMAL UPPER SURFACE OF THE CAP WHEREBY SAID LOWER EDGE OF THE MEMBER IS MAINTAINED OUT OF CONTACTING RELATIONSHIP WITH THE CAP WHEN THE MEMBER IS ON THE RETAINER IN A POSITION WITH SAID SHOULDER IN TIGHT SEALING ENGAGEMENT WITH THE SEGMENT.		YES
5		ONE OF THE NORMALLY INTERENGAGED SURFACES OF THE SHOULDER AND SEGMENT RESPECTIVELY IS SUBSTANTIALLY CONICAL TO PRESENT AN INCLINED ANNULAR FACE COAXIAL WITH THE MEMBER AND SAID RETAINER AND OF SUFFICIENT DIAMETER AT THE LARGEST END THEREOF TO CAUSE THE SEAL EFFECTED BETWEEN THE SHOULDER AND SAID SEGMENT TO BECOME TIGHTER AS THE SHOULDER SLIDES ON SAID SEGMENT DURING SHIFTING OF THE MEMBER TOWARD THE CAP.	YES

527

ACCUSED DEVICE

CALMAR SPRAYER & COVER CAP ASSEMBLY
AS COMMERCIALIZED BY
COLGATE

	IS ELEMENT FOUND IN CALMAR DEVICE?
CLOSURE ASSEMBLY for LIQUID CONTAINER (Not Illustrated)	YES
CAP 12 (Colored Red)	YES
SPRAYER including BARREL 19 (Colored Flesh)	YES
TUBULAR PLUNGER 28 (Colored Orange)	YES
SPRAY HEAD 29 (Colored Brown)	YES
RETAINER 70 (Colored Green) having SCREW THREADS 82 and ANNULAR WALL 80	YES
HOLD DOWN CAP 88 (Colored Blue)	YES
INTERNAL SCREW THREADS 84 (Colored Blue)	YES
ANNULAR SEALING RING 99 (Colored Blue)	YES
ANNULAR SEALING RING 99 (Colored Blue) has INCLINED OUTER ANNULAR FACE C	YES

FIG. 1.

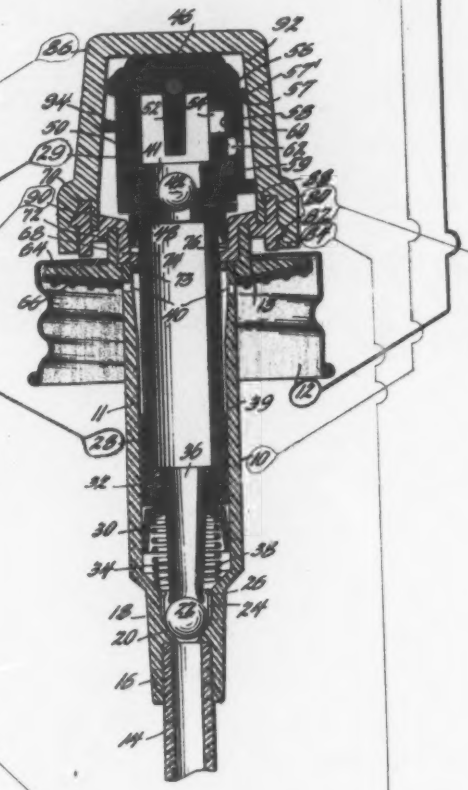
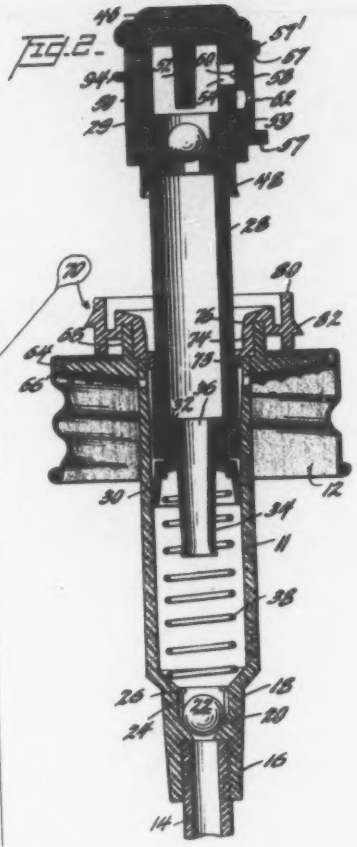
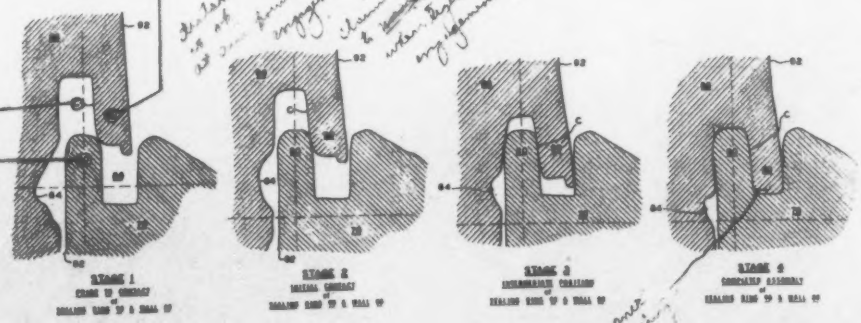


FIG. 2.





DEFENDANT'S EXHIBIT 121

529

Oct. 18, 1960 R. C. COOPRIDER ET AL 2,956,509

FLUID DISPENSING PUMPS

Filed Sept. 9, 1958 2 Sheets-Sheet 1

FIG. 1.

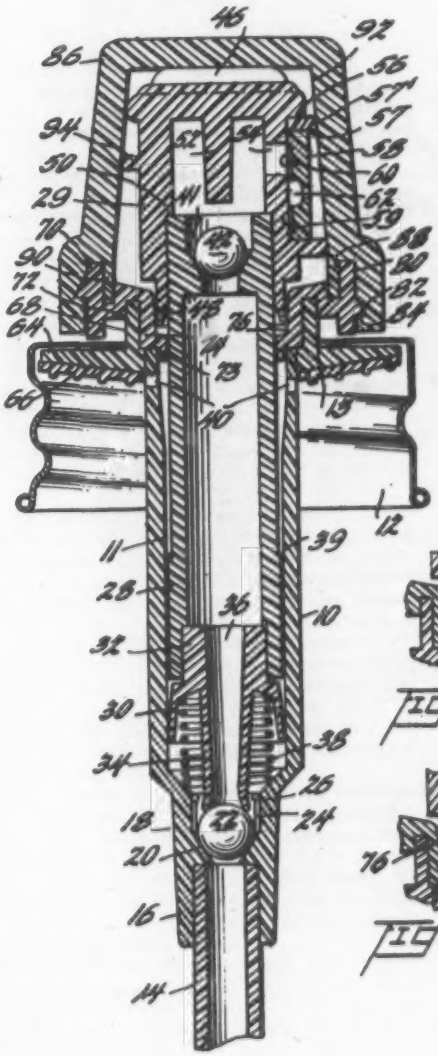


FIG. 2.

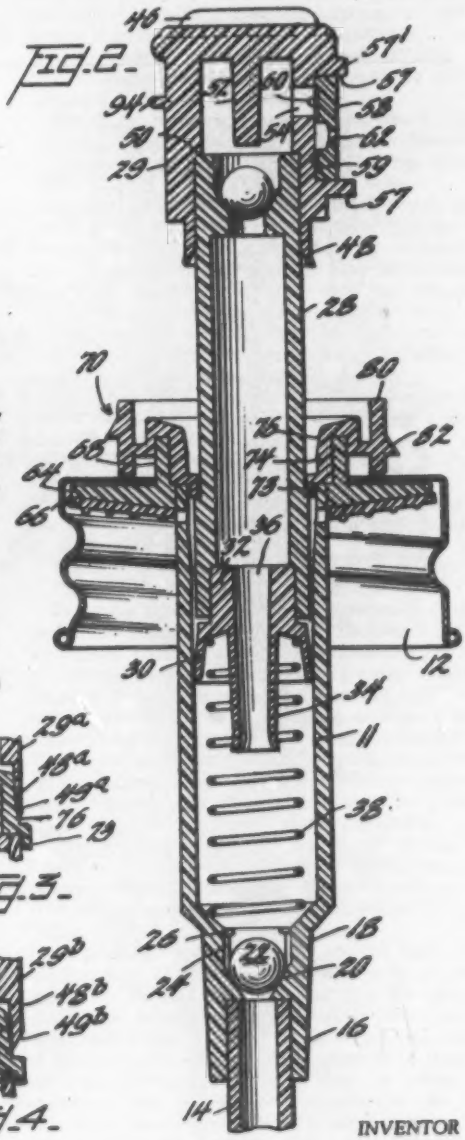


FIG. 3.

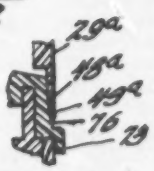


FIG. 4.



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530

Oct. 18, 1960 R. C. COOPRIDER ET AL 2,956,509

FLUID DISPENSING PUMPS

Filed Sept. 9, 1958 2 Sheets-Sheet 2

FIG. 5.

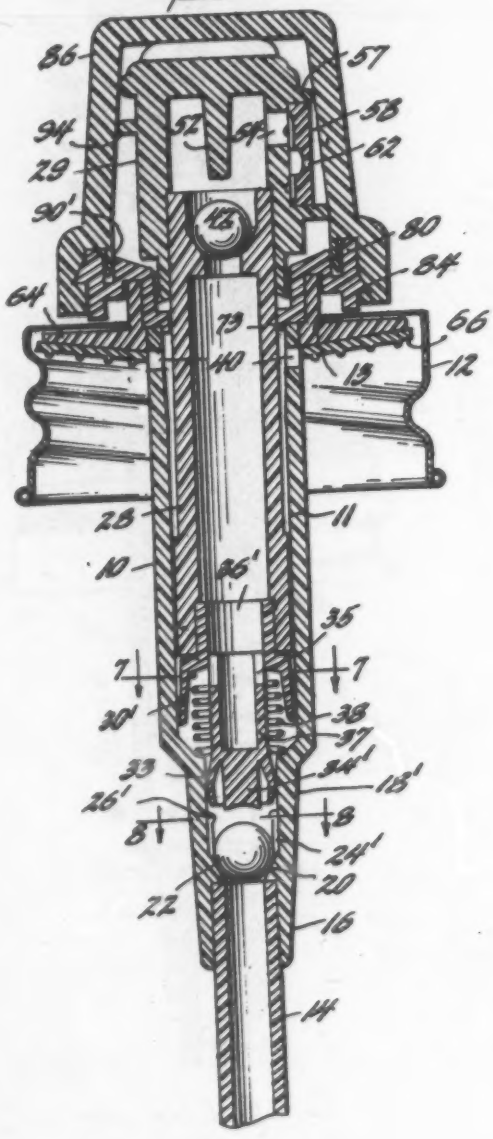


FIG. 6.

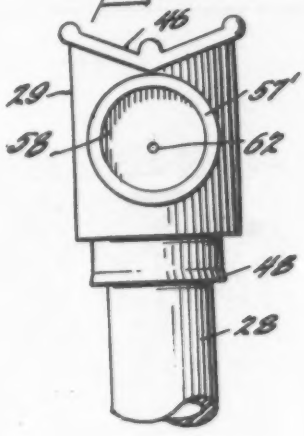


FIG. 7.

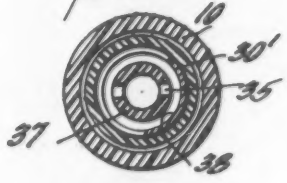
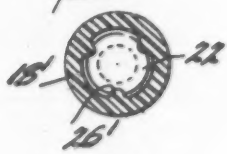


FIG. 8.



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531

United States Patent Office

2,956,509
Patented Oct. 18, 1960

2,956,509

FLUID DISPENSING PUMPS

Rex C. Cooprider, Downey, and Douglas F. Cornette, Los Angeles, Calif., assignors to The Drackett Company, Cincinnati, Ohio, a corporation of Ohio

Filed Sept. 9, 1958, Ser. No. 760,842

20 Claims. (Cl. 103—178)

This invention relates to new and improved fluid dispensing pumps of the class in which the pump plunger is immobilized in a predetermined position for packing and shipping purposes to avoid inadvertent actuation and discharge of the liquid contents of a container to which such a pump may be applied.

In liquid dispensing pumps adapted for application to and sale with containers for various commercially dispensed liquids, it has been heretofore known, as exemplified by the Lohse U.S. Patent 2,119,884, to utilize a protective cover for immobilizing the pump plunger in a predetermined depressed condition and also for trapping and retaining any liquid that may be inadvertently discharged from the pump. It has been found, however, that in practice a very appreciable amount of liquid may be discharged into such a protective cap due to inversion of the container and/or expansion of its contents. In such case, the liquid may escape either through the usual liquid discharge passage of the plunger and the plunger head or between the plunger and the barrel in which it works.

It is, accordingly, a primary object of the present invention to provide an improved form of fluid dispensing pump having means for retaining the plunger in immobilized position and including additional means rendered operative by immobilization of the plunger for closing off the plunger discharge passage and at the same time providing a fluid seal or block preventing egress of the liquid between the pump plunger and its associated barrel.

The preferred means for retaining the plunger thus immobilized is a protective hold-down cap which is threaded or otherwise secured to the container over the plunger head to depress the plunger to its immobilized position against spring pressure.

The invention further contemplates that the discharge opening or orifice of the plunger head will be surrounded by a frusto-conical sealing surface for cooperation with a similar frusto-conical interior surface of the protective cap whereby to prevent discharge of fluid from the plunger head into the cap incident to application of the cap and depression of the plunger to its immobilized position, as will as subsequent thereto.

It is a further incidental object to utilize such cooperating conical surfaces on the cap and plunger head respectively for automatically centering and locating the threaded skirt of the cap for cooperation with the threaded hold-down collar of the pump, the plunger and plunger head being rotatable about an axis coincident with said threaded collar to facilitate turning of the cap onto the collar.

A still further object of the invention is to provide the cap and the threaded collar or other portion on which it is received with cooperating sealing means. In particular, such sealing means may comprise an upwardly axially opening annular groove in the threaded collar and an integral sealing ring guided by the cap for jamming reception in said groove. With such arrangement, the cap may be formed of a somewhat flexible

resilient plastic, such as polyethylene, to attain an improved sealing function by its said sealing ring and such ring will further function to resist radial stretching of the cap skirt with consequent slippage of the threads during application of the cap by automatic machinery. In other words, this well-recognized difficulty inherent in threaded resilient caps is overcome by the present invention.

The foregoing as well as other incidental objects and advantages are all attained by the embodiments of the invention illustrated in the accompanying drawings in which:

Figure 1 represents an axial sectional view through a liquid dispensing pump of the invention and the threaded container cap to which it is applied, the intake or suction tube of the pump being shown but fragmentarily. In this view, the pump is shown with the plunger in its immobilized position and with the protective cap applied;

Figure 2 is a view of the pump structure shown in Figure 1, but with the protective cap removed and the pump plunger raised to operative position;

Figures 3 and 4 respectively are fragmentary sectional views taken in the same plane as Figures 1 and 2 and showing modified forms of plunger seals;

Figure 5 is a view similar to Figure 1, showing a slightly modified form of pump structure;

Figure 6 is a detail elevational view of the upper end portion of the pump plunger and plunger head as seen from the right in Figure 2;

Figure 7 is a section on the line 7—7 of Figure 5; and

Figure 8 is a section on the line 8—8 of Figure 5.

Referring now in detail to the accompanying drawings, and considering first the form of the invention illustrated in Figures 1 and 2, these figures illustrate the invention as embodied in a liquid dispensing pump, which in this instance is mounted in a usual threaded metal container cap for application to a bottle, can or other container to dispense the liquid contents thereof in a known manner. The pump comprises a stationary pump barrel 10, which may conveniently be molded or cast from a substantially rigid material such as vinyl plastic. The pump barrel 10 is of hollow tubular construction so that its interior defines a pump cylinder 11 and it will be seen that the barrel at its upper end is centered in and opens through a circular central opening 13 within the container cap 12. The particular manner in which the barrel is so mounted will be more fully described hereinafter.

Depending from the lower end of the barrel is a suction tube 14, which may be of plastic or other usual material. It will be understood that the lower end of such tube, which is broken away in the present drawings, will depend into the liquid within the container to a point closely adjacent to the bottom of the container whereby the liquid contents may be withdrawn and dispensed through the pump structure of the invention. The upper end of the tube 14 is received and frictionally or otherwise retained in a depending sleeve portion 16 integral with the pump barrel.

Also formed integrally with and communicating with the interior of the pump barrel at its lower end is a foot valve cage or housing 18 formed with an inclined annular valve seat 20 for cooperation with a foot valve element exemplified by the ball valve 22. It will be noted that the inwardly projecting valve seat portion 20 has a lower surface abutting against and thereby serving to position the upper end of the suction tube 14. The ball valve 22 may, if desired, be guided in its seating and unseating movement by a plurality of guide ribs 24 and its unseating movement is preferably limited by overlying inwardly projecting retainers or detents 26. These retainers have their inner ends disposed about a circle of very slightly smaller diameter than that of the ball valve 22. How-

ever, the plastic vinyl or other material from which the pump barrel is formed has sufficient inherent resiliency so that it may be expanded sufficiently to permit forcing the ball 22 downwardly past these retainers into the valve cage 18, during assembly of these parts.

Disposed for reciprocation within the pump barrel is a generally tubular plunger 28, which also may be formed of vinyl or other plastic material. It will be noted that the upper end of this plunger projects upwardly through the open upper end of the barrel 11 and above the container cap 12, where it carries a cap-like plunger discharge head 29.

At its lower end the plunger carries a piston consisting essentially of an inverted cup having downwardly and outwardly flaring skirt 30 in snug sliding engagement with the inner cylinder wall 11 of the pump barrel. In the embodiment shown, the piston 30 includes an upper sleeve extension 32 which is press-fitted into the lower end of the plunger or otherwise retained therein. Preferably, the several parts of the piston are integrally constructed of resilient material such as polyethylene plastic, whereby the lower edges of the piston skirt 30 may tend to resiliently expand into fluid-tight engagement with the inner wall 11 of the barrel and thereby function more efficiently.

At its lower end, the piston 32 carries a downward extension or probe 34, which, in this embodiment, is of downwardly opening tubular construction, the arrangement being such that a passage 36 extends completely through the piston from the lower end of the probe upwardly into communication with the tubular interior of the plunger 28 to provide a discharge passage portion connecting with the tube 14 through the intermediary of the foot valve 18.

For the purpose of raising the plunger 28 on its upstroke, there is provided a coil spring 38 disposed concentrically about the probe 34 under compression between the piston and the lower end of the cylinder within the pump barrel. An upwardly presented annular shoulder 39 on the plunger is disposed for abutting engagement with the wiper ring 73, more fully described hereinafter, to limit the upward stroke of the plunger.

In order that such fluid as may escape upwardly past the piston 30 may be returned into the container, there is provided a usual breather passage or passages 40 through the side of the barrel 10 just below the horizontal web of the container cap 12 and its associated sealing structure. Such port or ports 40 establish communication between the interior of the container and the interior of the pump barrel above the piston to permit return flow of the fluid, and also permit air from the container to flow into and from the barrel above piston 30, thus preventing an air lock such as might interfere with the plunger reciprocation.

Adjacent its upper end, the plunger 28 is provided with an additional valve seat 41 on which is seated a ball check valve 42 arranged to permit upward flow of fluid from the plunger head. The plunger discharge head 29 is shown as being in form of an inverted cup-like member having its depending skirt receiving and enclosing the open upper end of the plunger tube 28. The closed upper end 46 of the plunger discharge head is formed as a finger piece of suitable shape to permit actuation of the pump by repeatedly depressing it against the resilient force of its spring 38 and subsequently removing the finger pressure to permit the spring to return the plunger to its raised position. Internally the plunger head is formed with a depending stop 52 to limit unseating movement of ball 42.

It will be noted that when the plunger is fully depressed and in its immobilized position, as shown in Figure 1, the probe 34 at the lower end of the plunger will engage and force the ball valve 22 against its seat 20 and the ball valve thus will coact with both the seat 20 and the free end of the probe 34 to close off both against the passage of liquid.

The lower end of the plunger head 29 terminates externally of the plunger tube 28 in an annular sealing ring or skirt 48, the lower outer periphery or lip of which constitutes a sealing surface which is adapted for engagement and cooperation with an annular sealing surface 76 concentrically surrounding and spaced from the upper end of the pump barrel for preventing escape of fluid upwardly between the pump barrel and plunger, such as might otherwise occur, for instance, in the event the pump and its container are inverted or partially inverted, and the fluid contents of the container thus permitted to flow through the breather ports 40 into the space between the plunger and pump barrel. If desired, the sealing surface or periphery 49*a* of the plunger skirt may be formed parallel to the conical sealing surface 76, as in the modification of Figure 3, for flush wedging engagement between said surfaces. Or, if desired, and as shown in Figure 4, the peripheral sealing surface 49*b* may be formed as a knife edge for yielding line engagement with the surface 76.

It will be seen that on the upstroke of the plunger and plunger head the ball valve 42 will remain seated to apply suction, drawing liquid upwardly through the tube 14, the ball valve 22 being thereby unseated to permit passage of such liquid into the plunger tube 28. Then, as the plunger and plunger head are depressed, the wall valve 22 will reseat to prevent return flow of the liquid and the ball valve 42 will be opened to permit upward flow of the liquid into the plunger head 29 and thence outwardly through the discharge port or opening 54 in the side wall of the plunger head. While the discharge port 54 may communicate directly with the atmosphere, in the present embodiment it is shown as delivering the fluid into a spray nozzle structure for ejection in the form of a spray. To this end there is provided an annular recess 56 around the outer end of this discharge opening or port, said recess being defined by an annular radially-projecting wall 57, having its radially projected periphery 57' disposed on the surface of an imaginary cone to provide a sealing surface for cooperation with the conical interior of the protective cap as hereinafter described. Pressed into and frictionally retained or cemented within the annular recess 56 is a spray disc 58 having a spray discharge orifice 62, which receives fluid from the discharge passage 54 through usual tangential whirl passages 59 and an annular distributing passage 60.

Reverting now to the connection between the pump barrel 10 and container cap 12, such connection is defined in the preferred embodiment by an annular plastic member 64 cemented or otherwise secured around the upper end of the pump barrel for disposition beneath the horizontal web of the container cap and for clamping between said cap and the upper end or lip of the container neck on which the cap is to be applied. A suitable gasket 66 may be applied over the under-face of the member 64 for sealing engagement with the bottleneck or lip. Formed integrally with the member 64 is an upstanding annular wall 68 which projects upwardly through the central cap opening 13 for connection to the annular collar or adapter member 70, being preferably received and frictionally retained or cemented in a downwardly presented annular groove 72 in the collar 70, so that the cap 12 is effectively clamped between members 70 and 64. The lower end of the collar may conveniently support the wiper ring 73 hereinbefore referred to for sliding wiping engagement with the plunger tube 28 and for abutting engagement with the shoulder 39 of the plunger tube to limit the upward movement of the plunger. The inner wall 76 of the collar above the wiper ring 73 preferably converges downwardly in the form of a conical sealing surface spaced from the plunger tube for reception of and sealing engagement with the depending annular sealing skirt 48 of the plunger head. The skirt 48 and plunger head are both preferably formed integrally of a resilient plastic such as polyethylene and the collar 70 is prefer-

ably formed of a substantially rigid material such as vinyl plastic. The annular outer wall 80 of the collar is formed externally with screw threads 82 for cooperation with internal screw threads 84 on the depending inner wall portion of the protective cap 86. It will be seen that the cap 86 is disposed over the upper end of the plunger and plunger head and that its upper end engages the finger piece 46 to depress the plunger head and plunger to immobilized position as shown in Figure 1 when the cap 86 is threaded tightly onto the collar 70.

It will be apparent that frictional engagement between the skirt 48 and surface 76 may be relied upon, at least temporarily, to maintain the plunger in its depressed immobilized and sealed condition, even in the absence of the protective hold-down cap 86.

In order to effect a liquid tight sealing engagement between the cap 86 and the collar 70, the collar is formed with an upwardly presented groove 88 inwardly of its threaded outer wall 80 for reception of a depending annular sealing ring 90 on the cap. The dimensions of the groove and sealing ring are so related that the sealing ring 90 preferably makes a jamming fit into the groove 88.

It is preferred that the cap 86 be of resilient material in order that its conical interior sealing surface 92 may form a fluid tight sealing engagement with the conical peripheral surface 57' of the spray head and also so that its sealing ring 90 may form a yielding fluid tight fit within the groove 88. Where the cap is thus formed of resilient plastic, however, it is subject to the usual and known difficulty that excessive tightening of the cap, as by automatic capping mechanism, may tend to expand the lower edge of the cap skirt so that the threads 84 of the cap will override and become disengaged from the threads 82 on the collar. However, the depending ring or skirt 90, in addition to performing its sealing function, will resist such expansion tendency and thus adapt the resilient material caps for efficient application by automatic capping mechanism.

For the purpose of automatically centering the protective cap 86 and guiding its threaded skirt accurately onto the threads of the collar 70, there is provided on the plunger head a radially projected boss 94, the radially outer end of which lies on a common cone with sealing surface 57' and cooperates with the projecting conical periphery 57' to engage the conical inner surface of the cap and center same coaxially with respect to the plunger and the collar. Moreover, the plunger and plunger head are both rotatable together with respect to the barrel 10 and container cap 12 and will thus facilitate threading of the protective cap 86 onto the collar 70.

In the operation of the embodiment just described, it will be apparent that the pump structure, the threaded container cap 12 and the protective cap 86 may be preassembled as a unit as in Figure 1 and thereafter applied to a bottle or other liquid container in obvious manner. In such event the ball 22 of the foot valve will be seated by engagement with the lower end of the tubular probe 34 and thus will prevent upward movement of any of the container contents past the valve seat or into the plunger. While possibly liquid may be permitted to enter the space between the plunger and its barrel through port or ports 40 incident to inversion of the container, expansion of its contents, or leakage past the piston 30, the sealing engagement of the plunger head sealing ring 48 with the inner conical surface 76 of the collar 70 will normally prevent accidental escape of the fluid beyond this point. In the event, however, that the seal provided by the ring 48 should be imperfect, then any fluid which escapes will nevertheless be maintained and confined in the protective cap 86 by the action of the seal 90. Similarly, the cooperation between the conical surfaces 92 and 58' of the protective cap and plunger head respectively will normally prevent escape of fluid from the plunger interior, though if any leakage should occur, it also would be contained within the cap 86.

After the pump has been used, it will be seen that a certain amount of residual liquid will tend to remain in the hollow plunger barrel, and when this plunger is then depressed incident to application of the protective cap 86, this will tend to expel such residual liquid outwardly from the discharge head 29. However, it will be noted that, immediately upon application of the cap 86 over the spray head, the cooperation between the conical sealing surfaces 92 and 57 is rendered operative to resist such liquid discharge, and such cooperation is in fact improved by the pressure exerted on the cap in thus depressing it.

Moreover, the conical surface 57' and the boss 94 will coact with the conical inner surface 92 of the cap to center the latter, and the rotatably disposed plunger accurately guides the threaded skirt of the cap onto the threaded collar 70, while permitting free rotation of the cap during its application to the collar.

Because of the axial disposition of sealing surface 76, it will be apparent that this surface will coact with the skirt or ring 48 to provide an effective seal for preventing leakage between the pump plunger and barrel throughout a substantial range of axial positioning of these parts, thereby permitting substantial manufacturing tolerances. Thus the seals 48—76 and the seal provided by cooperation between the plunger and foot valve 18, will effectively prevent leakage, both between the plunger and barrel and through the plunger, in the depressed and immobilized position of the plunger. Moreover, such position may be maintained either through the protective cap 86 or through the frictional action of the seals 48—76 as heretofore mentioned.

In the form of the invention shown in Figure 5, the structure and function are identical to those heretofore described, except as to the arrangement of the plunger piston and probe and the cooperation of these parts with the foot valve. Accordingly, parts which are identical to those in the structure heretofore described are identified by similar reference characters, while modified parts or elements are herein identified by distinctive reference characters. Thus, in the modification of Figure 5, the plunger piston 30' consists basically of the downwardly flaring skirt of resilient plastic material, as heretofore, and includes an annular collar 36' by which it is supported in the lower end of the plunger tube 28. In this modification, however, the probe 34' is closed at its lower end and is surrounded by and includes a flaring resilient piston skirt 33 for snug fluid tight reception in the upper portion of the valve cage 18' in the depressed position of the valve plunger. Above the piston skirt 33 the probe 34' is hollow and is provided with one or more outwardly opening ports 35, so that when the piston skirt or plug 33 is withdrawn upwardly from the valve cage and into the relatively greater diameter pump barrel, the fluid is free to pass upwardly around the plug 33 and into the plunger barrel through the ports 35 incident to reciprocation of the plunger. In this, as well as in the preceding embodiment, it is apparent that the probes 34—34' coact with the foot valve, though in somewhat different manners, to arrest the upward flow of the fluid from the tube 14 when the valve plunger is fully depressed. In addition, in each of these modifications the probes 34 and 34' may be used during assembly of the foot valve to force the valve element or ball 22 downwardly into its cage past the detainers or detents 26 or 26'.

It will be appreciated that reference herein to a vertical disposition of the pump and of its principal parts, and to upper and lower locations and positions of component parts, is employed merely for convenience in describing and claiming the structure embodying the invention. While the pump normally occupies a generally upright position, it is, of course, usable when held in various other positions.

In this application, we have shown and described only

the preferred embodiment of our invention and a simple modification thereof, in order to illustrate the best mode presently known to us of carrying out our invention. However, we realize that the invention is capable of other and different embodiments and its several details may be altered in various respects, although without departing from our invention. Accordingly, the drawings and description herein are to be construed as merely illustrative in nature and not as restrictive.

Having thus described our invention, we claim:

1. A liquid dispensing pump comprising a generally vertical cylindrical barrel, an annular collar secured concentrically around the upper end of said barrel, a plunger reciprocally disposed in said barrel and projecting from the upper end of said barrel, the upper end of said plunger constituting a discharge head and having a liquid passage opening therethrough to define a discharge port, spring means coacting between said barrel and said plunger for urging the plunger upwardly from the barrel, a foot valve in the lower end of said barrel for permitting upward flow of liquid into said barrel, while preventing downward flow of said liquid and a probe carried at the lower end of said plunger for closing said valve in a predetermined position at the lowermost extremity of the reciprocating movement of said plunger, in combination with annular sealing surfaces formed on said collar and said plunger respectively, externally of the plunger for operative sealing engagement in said predetermined position of the plunger, to prevent upward leakage of liquid between the barrel and plunger, said liquid passage extending from said discharge port downwardly through said plunger and its said probe for normal communication with and control by said foot valve.

2. The liquid dispensing pump of claim 1, wherein said foot valve comprises a valve ball and a cylindrical valve cage confining said valve ball and of smaller diameter than the interior of said pump barrel and said plunger, and normally communicating at its upper end with the interior of said barrel, said plunger including a piston snugly reciprocally received in said pump barrel above said probe, said probe carrying a plug at its lower end for reception in said valve cage, said passage extending downwardly through said piston and opening between said piston and said plug.

3. A liquid dispensing pump as defined in claim 2, wherein said foot valve includes a valve ball operatively disposed in said valve cage, said cage having an inwardly projecting retainer above said valve ball for limiting the unseating movement thereof, and said probe depending to a sufficient extent in the said predetermined position of the plunger to press said valve ball from above to beneath said retainer for assembly purposes, said valve cage being formed of a material having sufficient elasticity to permit the displacement of said retainer incident to assembly of the valve ball.

4. A liquid dispensing pump as defined in claim 1, including means on said plunger for selectively securing said plunger in its said predetermined position of reciprocation.

5. A liquid dispensing pump as defined in claim 4, wherein said means comprises a cap having a threaded skirt, and threads on said collar for cooperation with said threaded skirt.

6. A liquid pump as defined in claim 1, wherein one of said annular sealing surfaces extends and converges downwardly for jamming frictional engagement with the other of said annular sealing surfaces, sufficiently to frictionally maintain the plunger in said predetermined position.

7. The combination defined in claim 6, wherein said one sealing surface is formed on the said collar for concentric reception of the sealing surface carried by the plunger discharge head, said discharge head carrying a depending downwardly and outwardly flaring resilient skirt having its downwardly and outwardly flaring periphery defining the said sealing surface of the discharge head.

8. The combination defined in claim 7 in which said outwardly flaring periphery is formed with a downwardly diverging conical surface for flush sealing wedging engagement with said one sealing surface.

9. A liquid dispensing pump as defined in claim 1, wherein said foot valve includes a valve cage communicating at its upper end with said pump barrel, and a valve ball movable downwardly in said cage to close said valve, said probe depending from the plunger to such extent as to engage and maintain the valve ball in valve closing position in said predetermined position of the plunger.

10. A liquid dispensing pump as defined in claim 9, wherein said liquid passage opens through said probe in position to be covered and closed by engagement of the probe with the valve ball.

11. In a fluid dispensing pump, the combination with a generally vertical cylindrical pump barrel having at its upper end a collar having threads thereon, of a plunger reciprocally disposed in said barrel and having at its upper end and above said collar a discharge head having a discharge orifice for fluid, spring means acting between said barrel and plunger for urging said plunger upwardly in said barrel, a check valve associated with said barrel to prevent downward movement of fluid therein, said plunger being forced to provide a discharge passage extending therethrough and communicating with said discharge orifice, a protective cap dimensioned to embrace said discharge head, said cap having a skirt for engagement with the threads on said collar to hold said plunger in a depressed and immobilized position against the action of said spring means, coacting sealing surfaces on said plunger and collar, said sealing surfaces being engaged when said cap is threaded on said collar to seal said barrel to prevent leakage externally of said plunger, means operable when said plunger is depressed and immobilized to seal said discharge passage to prevent leakage internally of said plunger, said last named means comprising a sealing ring surrounding said discharge orifice and having a contour conforming with the contour of the interior surface of said cap and positioned for sealing engagement with said cap in the depressed and immobilized position of said plunger, and coacting sealing surfaces on said cap and collar to contain within said cap liquid escaping from a defective seal either externally or internally of said plunger.

12. In a fluid dispensing pump, the combination with a generally vertical cylindrical pump barrel having at its upper end a collar having threads thereon, of a plunger reciprocally disposed in said barrel and having at its upper end and above said collar a discharge head having a discharge orifice for fluid, spring means acting between said barrel and plunger for urging said plunger upwardly in said barrel, a check valve associated with said barrel to prevent downward movement of fluid therein, said plunger being formed to provide a discharge passage extending therethrough and communicating with said discharge orifice, a protective cap dimensioned to embrace said discharge head, said cap having a skirt threaded for engagement with the threads on said collar to hold said plunger in a depressed and immobilized position against the action of said spring means, coacting sealing surfaces on said plunger and collar, said sealing surfaces being engaged when said cap is threaded on said collar to seal said barrel to prevent leakage externally of said plunger, means operable when said plunger is depressed and immobilized to seal said discharge passage to prevent leakage internally of said plunger, said last named means comprising a sealing ring surrounding said discharge orifice and a contour conforming with the contour of the interior surface of said cap and positioned for sealing engagement with said cap in the depressed and immobilized position of said plunger, said plunger having means for engaging said check valve and retaining the same in closed position when said plunger is depressed and immobilized, and

coacting sealing surfaces on said cap and collar to contain within said cap liquid escaping from a defective seal either externally or internally of said plunger.

13. In a fluid dispensing pump, the combination with a generally vertical cylindrical pump barrel having at its upper end a collar having threads thereon, of a plunger reciprocally disposed in said barrel and having at its upper end and above said collar a discharge head, spring means acting between said barrel and plunger for urging said plunger upwardly in said barrel, valve means associated with said barrel and plunger to prevent downward movement of fluid therein, said plunger being formed to provide a discharge passage extending therethrough and communicating with said discharge head, a protective cap dimensioned to embrace said discharge head, said cap having a skirt threaded for engagement with the threads on said collar to hold said plunger in a depressed and immobilized position against the action of said spring means, coacting sealing surfaces on said plunger and collar, said sealing surfaces being engaged when said cap is threaded on said collar to prevent leakage from said barrel externally of said plunger, means operable when said plunger is depressed to seal said discharge passage to prevent leakage from said barrel internally of said plunger, said last named means comprising a sealing ring surrounding said discharge orifice and having a contour conforming with the contour of the interior surface of said cap and positioned for sealing engagement with said cap in the depressed and immobilized position of said plunger, and coacting sealing surfaces on said cap and collar, said last named surfaces being engaged when said cap is threaded on said collar.

14. In a fluid dispensing pump, the combination with a generally vertical cylindrical pump barrel having at its upper end a collar having threads thereon, of a plunger reciprocally disposed in said barrel and having at its upper end and above said collar a discharge head, spring means acting between said barrel and plunger for urging said plunger upwardly in said barrel, valve means associated with said barrel and plunger to prevent downward movement of fluid therein, said plunger being formed to provide a discharge passage extending therethrough and communicating with said discharge head, a protective cap dimensioned to embrace said discharge head, said cap having a skirt threaded for engagement with the threads on said collar to hold said plunger in a depressed and immobilized position against the action of said spring means, coacting sealing surfaces on said plunger and collar, said sealing surfaces being engaged when said cap is threaded on said collar to seal said barrel to prevent leakage externally of said plunger, means operable when said plunger is depressed and immobilized to seal said discharge passage to prevent leakage internally of said plunger, and coacting sealing surfaces on said cap and collar, said last named surfaces being engaged when said cap is threaded on said collar and comprising a depending concentric annular flange on said cap, said collar being formed to provide a concentric annular groove dimensioned to receive said flange with a snug fit.

15. In a fluid dispensing pump, the combination with a generally vertical cylindrical pump barrel having at its upper end a collar having threads thereon, of a plunger reciprocally disposed in said barrel and having at its upper end and above said collar a discharge head, spring means acting between said barrel and plunger for urging said plunger upwardly in said barrel, valve means associated with said barrel and plunger to prevent downward movement of fluid therein, said plunger being formed to provide a discharge passage extending therethrough and communicating with said discharge head, a protective cap dimensioned to embrace said discharge head, said cap having a skirt threaded for engagement with the threads on said collar to hold said plunger in a depressed and immobilized position against the action of said spring means, said discharge passage opening radially through said discharge head, said head being formed to provide a sealing surface defining a portion of a downwardly diverging cone surrounding said opening, the conical axis of said sealing surface being coincident with the axis of the threads on said collar, said cap being formed internally with a sealing surface of similar conical configuration, whereby turning of the cap onto said collar effects sealing engagement between said sealing surfaces.

16. A fluid dispensing pump comprising a generally vertical cylindrical pump barrel having at one end thereof a collar having threads thereon, a plunger reciprocally disposed in said barrel and having at its upper end and above said collar a discharge head, spring means acting between said barrel and plunger for urging said plunger upwardly in said barrel, valve means seating in said barrel below said plunger to prevent downward movement of fluid in said barrel, said plunger being formed to provide a discharge passage extending therethrough and communicating with said discharge head, a protective cap dimensioned to embrace said discharge head, said cap having a skirt threaded for engagement with the threads on said collar to hold said plunger in a depressed and immobilized position against the action of said spring means, coacting sealing surfaces on said plunger and collar, said sealing surfaces being engaged when said cap is threaded on said collar to prevent leakage from said barrel externally of said plunger, means operable when said plunger is depressed and immobilized to seal said discharge passage to prevent leakage from said barrel internally of said plunger, said last named means including a probe at the lower end of said plunger forming a continuation of said discharge passage, said probe being formed to provide a seat engaging said valve means to hold the latter in the seated position in said barrel when said plunger is depressed and immobilized, whereby said valve means blocks both said barrel and said discharge passage, and coacting sealing surfaces on said cap and collar to contain within said cap liquid escaping from a defective seal either internally or externally of said plunger.

17. A fluid dispensing pump comprising a generally vertical cylindrical pump barrel, a plunger reciprocally disposed in said barrel and having at its upper end a discharge head, spring means acting between said barrel and plunger for urging said plunger upwardly in said barrel, valve means seating in said barrel below said plunger to prevent downward movement of fluid in said barrel, said plunger being formed to provide a discharge passage extending therethrough and communicating with said discharge head, means acting between said plunger and said barrel to hold said plunger in a depressed and immobilized position against the action of said spring means, means operable when said plunger is depressed and immobilized to seal said discharge passage to prevent leakage from said barrel internally of said plunger, said last named means including a probe at the lower end of said plunger forming a continuation of said discharge passage, said probe being formed to provide a seat engaging said valve means to hold the latter in the seated position in said barrel when said plunger is depressed and immobilized, whereby said valve means blocks both said barrel and said discharge passage, and coacting sealing surfaces on said cap and collar to contain within said cap liquid escaping from a defective seal either internally or externally of said plunger.

18. In a fluid dispensing pump, the combination with a generally vertical cylindrical pump barrel having at its upper end a collar having threads thereon, of a plunger reciprocally disposed in said barrel and having at its upper end and above said collar a discharge head having a discharge orifice for fluid, spring means acting between said barrel and plunger for urging said plunger upwardly in said barrel, a check valve associated with said barrel to prevent downward movement of fluid therein, said plunger being formed to provide a discharge passage extending

536

therethrough and communicating with said discharge orifice, a protective cap dimensioned to embrace said discharge head, said cap having a skirt threaded for engagement with the threads on said collar to hold said plunger in a depressed and immobilized position against the action of said spring means, coacting sealing surfaces on said plunger and collar, said sealing surfaces being engaged when said cap is threaded on said collar to seal said barrel to prevent leakage externally of said plunger, means operable when said plunger is depressed and immobilized to seal said discharge passage to prevent leakage internally of said plunger, said last named means comprising coacting sealing surfaces relatively displaced into engagement when said cap is threaded on said collar to block flow of liquid through the discharge passage and hence to said orifice, and coacting sealing surfaces on said cap and collar to contain within said cap liquid escaping from a defective seal either externally or internally of said plunger, the coacting sealing surfaces of each of said seals being angularly disposed with respect to the axis of the plunger, whereby pressure is applied between said surfaces when said cap is threaded down on the collar.

19. A fluid dispensing pump as claimed in claim 18 in which said means operable to seal said discharge passage comprises a probe carried by said plunger and engaging said check valve on depression of said plunger to hold said valve in seated position.

20. A fluid dispensing pump as defined in claim 18, wherein said fluid discharge passage opens radially through said discharge head, said head including a conical downwardly diverging sealing surface surrounding said opening,

the conical axis of said conical sealing surface being coincident with the axis of said threads on said cap and said collar respectively, said cap being formed internally with a similar conical sealing surface, whereby turning of the cap onto said collar will automatically interengage the said conical sealing surfaces, said discharge head having on its diametrically opposite sides from its said sealing surface a radially projecting boss, the outer end of which lies on a common cone with said sealing surface of the said head to coact with said last mentioned sealing surface for centering said cap relative to said discharge head and for positioning the threaded skirt thereof concentrically to the threads around said collar, said plunger and its discharge head being rotatable in said barrel about an axis coincident with the generatrix of said threads for facilitating the application of said cap to said threaded collar.

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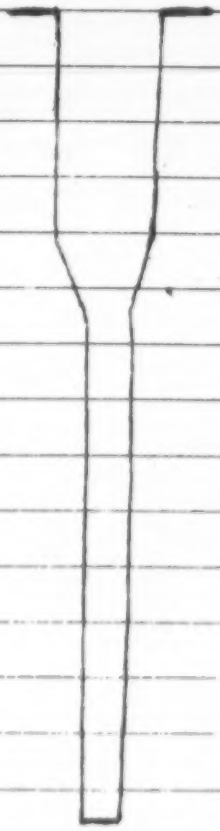
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DEFENDANT'S EXHIBIT 150

537



D 14's Wire in 4 2d

Stem 5 1/2 5/16

DEFENDANT'S EXHIBIT 160

538

CALMAR , INC. - CUSTOMER CONTACT REPORT ✓

SALES DIVISION			
VISIT	PHONE	DATE 3/11	DATE WRITTEN 3/12
CALMAR PERSONNEL			

INDUSTRY	Chemical
APPLICATION	t. acid
CALMAR PRODUCT	525-LP
COMPETITION	

CINCINNATI ROUTING	
J. BOEHM	
[illegible]	
[illegible]	
FILE	

FIRM NAME IN FULL-DO NOT ABBREVIATE-INDICATE DIVISION IF ANY: S. C. Johnson & Son, Inc. PHONE NO.

STREET CITY: Racine ZONE STATE: Wis

PERSONS INTERVIEWED AND POSITIONS: J. Luyster, C. Lacher, B. Pettibone

ACTION ☐ Taken ☐ Requested

#1

As collation agent from Johnson - shows a definite improvement but not satisfactory when percentages are still high.

We are in process of changing our lines but this, first they have to move out fast to do something to improve the 1970 cap linkage and ordered which I wish them to run some tests to test - thickness of cut to be equal to thumb thickness. If it proves satisfactory they will change lines again -

I feel that we should test cut tests at our lab this agent to a ✓ our initial effort and we may have an answer ✓ on this a Tes, they still have some interest in a smaller diameter flange to test out.

Co. Pettibone has a smaller flange and a [illegible] has the same regular flange - all the [illegible] to test - will Pettibone test cap in the

Form No. SC - 1011 - 757

Delta Wire & Form 15 Jul 3-5/60

539

CALMAR, INC. - CUSTOMER CONTACT REPORT

SALES DIVISION			
VISIT	PHONE	DATE	DATE WRITTEN
CALMAR PERSONNEL			

INDUSTRY
APPLICATION
CALMAR PRODUCT
COMPETITION

CINCINNATI ROUTING	
J. BOEHM	
R. WISE	
C. ARMSTRONG	
FILE	

FIRM NAME IN FULL-DO NOT ABBREVIATE-INDICATE DIVISION IF ANY — PHONE NO.

S. C. Johnson & Son, Inc.

STREET — CITY — ZONE — STATE

Racine, Wisc

PERSONS INTERVIEWED AND POSITIONS

62

ACTION ☐ Taken ☐ Requested

looking.

I was told Tuesday that of 2,000,000 in orders of product and related products some instant that entire project would be treated out - they are in the middle and have to keep going.

That is why they have to exchange trains at so many fittings as delivery dates if product are received + as a result - If caldid not - inspection, all units have to be changed again -

I am stopping a costume made a collapse case one piece, it cannot be made to ... slide the cap here.

As you can see the cap design would be serious to get the units, I am trying to improve it -

Vik

10% - please bear in mind that ... single separation as it may be used on larger ... and we may get an order on this cap for 10,000 units.

Form No. SC - 10M - 757

DEFENDANT'S EXHIBIT 162

540

CALMAR , INC. - CUSTOMER CONTACT REPORT

SALES DIVISION	INDUSTRY Chemical	CINCINNATI ROUTING
Visit: X Phone: 5/19/58 5/20/58	APPLICATION Liquid	J. BOEHM JLB
CALMAR PERSONNEL	CALMAR PRODUCT S 25 L P	G. ARMSTRONG
		FILE
	COMPETITION	

FIRM NAME IN FULL-DO NOT ABBREVIATE-INDICATE DIVISION IF ANY: B. C. Johnson & Son, Inc. PHONE NO.

STREET CITY ZONE STATE: Racine, Wisconsin

PERSONS INTERVIEWED AND POSITIONS: J. Luyster, R. Patterson

B. Pettibone

ACTION: Taken ☐ Requested ☐

Subject

Raid VS Plastics

Serious problems are developing. Shipping under separate cover representative parts showing defects.

Pettibone, by testing, has come to a conclusion that the Sprayer in lock position in product - is causing the piston to split. The spring tension is holding cup washer in position and attaching product (Raid) is swelling the washer and causing outward pressures resulting in split piston.

Two, in correlating the above results: pistons and attached cup washers have been placed in product and no split pistons have developed. Implying that cup washer pressures are being exerted downward or else cup washer can move down out of friction fit position.

Pettibone suggests that we consider designing the cup washer to fit on outside diameter of piston.

A figure of 90%, of 100,000 units re-worked in their plant showing these conditions, was mentioned to me. If, so, I just can't see how they will come out of the retail market with a clean shirt. Too, they admitted that much more product could have moved this season but the brakes were applied to the promotion.

Norm Davis

P S The end is still around the corner.

Form No. SC - 1011 - 757

Dell's Wire Ex 16 Det
Hrn: 5/15/60

541

[1211] DEFENDANT'S EXHIBIT 198.

CALMAR, INC.

December 18, 1957

Development Committee Meeting of December 17th

Present: R. Cooprider, T. Covington, H. Harnage, J. Martin, J. Noblett, W. Roots, J. Stewart, R. Wise

R. Wise reported that 500 samples D510 most recently forwarded to Cincinnati lab for testing and evaluation had performed satisfactorily. D510 could now be considered approved for production.

Any requests for samples of D510 must be approved by R. Wise before supplying.

R. Wise requested the following D510 samples be produced as quickly as possible and shipped on instructions he will furnish later.

100 D510—50 each "Standard" Ivory & Lanolin Plus Turquoise Outer Bodies
All inner bodies "Standard" Ivory
50 with Turquoise Rubber Bulbs
50 with Turquoise Vinyl Bulbs

Additional

500 D510—All Inner Bodies "Standard" Ivory Vinyl
Outer Bodies Assorted Colors to be advised
Vinyl Bulbs Assorted Colors to be advised

J. Stewart to provide "Avon" colors for 100 of the above Outer Bodies & Bulbs. These "Avon" samples to be ready prior to January 15th Sales Meeting.

R. Wise will explore with Jerry Kay the possibility that a revised Flexible vinyl formulation may be developed to overcome the "Leaching and Hardening" experienced in prior tests with Lanolin Plus products.

H. Harnage to furnish the following as soon as possible:

Revised tooling cost for production of Outer Bodies
" " " " " " Inner Bodies
" " " " " " Vinyl Bulbs
" " " " " " Rubber Bulbs

Estimated cost of assembly jigs etc. required

Revised cost for production and assembly of D510 components

Productive capacity for all the above.

The best possible target date for volume production of D510

[1212] Rex Cooprider to furnish at the earliest possible date detailed specification sheets for the approved D510.

"Leakproof Sprayers"

R. Wise reported that Colgate rejected our "Leakproof Boots" and expressed preference for "Bakan" appearance. Would, however, prefer that item be a true leakproof sprayer rather than just a "shipping closure" as produced by "Bakan".

All present were requested to give some thought to a "true leakproof sprayer" similar in general appearance to "Bakan".

All of the foregoing necessitated by the failure of our present S25/LP to "seal" many low viscosity products.

R. Wise reported S. C. Johnson gave favorable reception to leakproof boot, but all samples submitted so far failed in compatibility tests with Johnson's "Raid".

H. Harnage obtaining new vinyl compound from Maclin developed to be compatible with "Raid".

When compound available, "Windex" sprayers with "Boots" of new compound to be forwarded to H. Wise for compatibility tests with "Raid".

J. Stewart reported Wilco interest in "Boot" for "Biff Ant and Roach" requirement 50-75M per year.

H. Harnage to provide soonest availability and cost of 50-75M per year vinyl "Boots" so that he and J. Stewart can submit to Wilco.

R. Wise advised last samples of vinyl "boots" forwarded to Cincinnati lab for compatibility tests are still under test—no results yet available.

Consideration to be given to Rex Cooprider suggestion for "molding" closed ends on "boots" to eliminate sealing problems.

RS10/LP request (25M) by E. Spencer was discussed and rejected because of small volume potential.

Rex Cooprider reported on project "Eliminating" need for collar on S25-D250 etc.—requested permission to further develop on premise that smaller diameter piston would be acceptable.

[1213] Further consideration to be given to possibility that project can be successfully completed using present piston diameter of Cycolac material.

Rex was particularly requested by R. Wise to spend some time on the "Genuinely Leakproof-High Aesthetic Appeal" leakproof sprayer—see earlier notes.

Rex to develop "Fine Mist Sprayer of White Cycolac" employing S25 components except head which is to be "O" type. 100 of same to be forwarded to R. Wise in time for January 15th Sales Meeting—employing 30MM Black Molded Caps and Windex 6-oz. length specification.

Rex was instructed by R. Wise to be responsible for weekly "Development Steering Meetings". If possible meetings to be attended by H. Harnage, Ott Duda, Rex Cooprider and J. Stewart every Friday Morning at 8:00. Rex to report to R. Wise weekly regardless of attendance at meetings. Miss Newhall will provide any secretarial assistance he requires.

Rex to provide for R. Wise in time for his return to Cincinnati samples of "Calmar Aerosol Valves" hand fabricated. Both loose components and finished valves assembled to loaded "Blue Mist Windex".

R. Wise will investigate possibility of patent protection on this new project.

R. Wise reported Colgate interest in aerosol valves as per patent drawings:

D. Michel	2,612,293
A. S. Lapin	2,704,172
J. W. Soffer	2,643,015
H. F. Tomasek	2,615,597

Similar to either of the valves and covers described by patents.

R. Wise advises he would discuss the patents involved with our attorney and report back.

cc: Those Present
O. Duda

544

[1214] DEFENDANT'S EXHIBIT 200.

CALMAR, INC.

TO: All Department Heads

FROM: R. D. Wise November 20, 1958

SUBJECT: The SS-40 Shipper Sprayer

The purpose of this report is to tell you of the development of the new SS-40 sprayers and to answer some of the many questions that you have been asking about it.

Overall marketing experience by sprayer manufacturers indicated a growing need for an improved shipper sprayer. A new sprayer which would be the safest possible shipping closure, easy to operate, more compact, as attractive to the consumer as aerosals and at the lowest possible cost—this is what our customers demanded and this is what we have developed in the SS-40 sprayer.

In recent weeks, many questions have been asked about the new sprayers. Questions and available answers are listed below:

WHY THE NAME SS-40?

The "SS" means "Shipper Sprayer". The #40 has no real meaning. However, it is an indication of the large number of changes made in configuration and tooling before the final product was adopted. Further "SS-40" does not conflict with any other product identification.

WHAT IS NEW ABOUT THE SS-40 SPRAYER?

The SS-40 sprayer has built-in integral seals to resist leakage. The seals are closed in final assembly. Other presently available sprayers do not have these built-in seals. The sprayers presently available and with which we are familiar have three points of leakage. For example:

[1215]

Present Sprayer Leakage Problem	SS-40 Sprayer Corrective Seal
A. Leakage up through the center of the sprayer caused by temperature differential.	A. A probe on the cupwasher closes against the bottom ball when the sprayer is in shipping or closed position.
B. Leakage at the piston collar junction.	B. The head-collar have a friction fit in the closed position. This friction fit is accomplished using 75 lbs. pressure before the over cap is applied. The over-cap holds the sprayer head in shipping position.
C. Leakage around the container cap particularly on (400) finish caps.	C. The SS-40 cylinder flange is tapered allowing room in the dome of the cap for a suitable gasket.

To be sure the built-in seals described above plus a seal at the over-cap-collar junction are all new. But there is more, to use an old expression—"the SS-40 is new from the ground up". From research to new designs, to engineering, there are new mounts, new die sets, new assembly fixtures, even new tool gauges and new inspection gauges. Everything about the product is new. Actually, it is the largest new product project in Calmar's history.

HOW DO CUSTOMERS HANDLE THE SPRAYER IN THEIR PLANTS?

Customers will receive SS-40 sprayers with the overcap in place, as the overcap will be installed at our factories. The customer *must be informed* that *under no circumstances should overcaps be removed.* The friction fit between the sprayer head and collar *must not be disturbed* or the seal may be damaged.

The overcap will be applied at our plants with approximately 10 inch pounds torque, the customer should apply

15 to 25 inch pounds torque to the container cap. Twenty inch pounds may be a good average figure depending on type of cap and gasket. Some experimentation may be required by the customer to determine optimum conditions for his container and product.

[1216] It should be noted that the overcap on the SS-40 sprayer has been designed so that it is small enough when used with deep throated chucks to minimize possible damage to the overcap particularly when caps larger than 24 M M are used. Use of torque discs to the container cap is of course to be recommended. Resina Cappers will be in use at our factories for applying the overcaps.

WHAT ABOUT CUSTOMER PACKAGING AND SHIPPING PROBLEMS?

Although the SS-40 is constructed of durable plastic materials, it can be damaged and the seals broken through abuse and inappropriate shipping containers. As is true of any plastic closure, excessive "working" of the seal is conducive to promoting leakage.

Therefore *customer shipping cartons should include provision for protection of the SS-40 from breakage* due to shock or high static loads as well as rubbing or fretting movements against the overcap during shipment.

A clearance of 1/4 to 1/2 inch between the top of shipping carton and the SS-40 overcap should probably be insured by a carton insert between the shoulder of the bottle or can and the carton lid. This may be accomplished by:

1. Paperboard tubes or sleeves around each SS-40 bearing on the shoulder of the container and the top of the carton.
2. A formed corrugated paperboard insert with holes punched to admit the SS-40 and to press against the container when the carton is closed.
3. A U-shaped corrugated paperboard insert inverted to press against and hold in position the containers during shipment thus preventing shock against the sprayer.

It is advisable for the customer to label the shipping container *"this side up"*. Some of our customers have also printed an *"arrow"* on the sides [1217] of the package indicating which side should be up.

It is of great importance to our customers that their products arrive in the hands of the consumer in excellent condition. It is equally important to Calmar that the consumer purchases products in "the pink of condition." Therefore our recommendations to our customers are such as to help insure that the containers with SS-40 sprayers are packaged and shipped in such manner as to avoid damage in transit and handling.

All sprayers, regardless of make or type should be protected during shipment.

As modern packaging becomes more complex, expensive, and ingenious it seems to be commonplace to print instructions or warnings on the shipping containers. *Actually* a check made at a local Kroger store on a Thursday night showed over 40 products being shipped in containers marked "This side up", "Fragile", "Right side up", etc.

WHY THREE DIFFERENT KINDS OF GASKETS?

A die cut polyethelene gasket .020" thick will be available as a standard item at no extra cost.

The polyethelene gasket has reasonably good chemical resistance, and by past experience has proven satisfactory for those customers who require high cap torques or who do have non-uniform container nozzle surfaces.

A die cut elastomeric vinyl gasket .020" thick is also available for those customers having products which are compatible with elastomeric vinyl. *Customer* testing of vinyl gaskets *is essential.* Elastomeric vinyl also has an advantage in being more resilient than polyethelene. Our experience has indicated that elastomeric vinyls may cause product compatibility problems particularly with insecticides, cosmetics, and medicinals.

Elastomeric vinyl gaskets are available at an extra cost of $1.50 per M units.

[1218] A die cut Neoprene gasket .020" thick is also available at an extra cost of $3.00 per M units.

Neoprene has the advantage of being resilient and offering good chemical resistant qualities for many products.

Customer testing of Neoprene is also essential. Present tests indicate good compatibility with insecticides.

Specifications for Neoprene gaskets are as follows:

50 shore hardness
1200 PSI tensile strength
450° elongation

Cylinders are ribbed to allow passage of air past gaskets to vent.

WHAT TYPES AND SIZES OF CAPS WILL THE SS-40 ACCOMMODATE?

Production tooling for the SS-40 will accommodate caps and gaskets as follows:

Beginning December 15

Metal Caps	Plastic Caps	Neoprene Gaskets
28 M M	None	28 M M
30 M M	None	30 M M
1" Can	None	1"
1 1/8" Beta Can	None	1 1/8" Beta
3/4" Plastic Nozzle	None	Not Required

Note: 1 1/8" cap for Accupour can only.

Beginning February 1

22 M M	1/2" Detergent Cap	Not required, poly nozzle
24 M M	24 M M	22 M M
28 M M	28 M M	28 M M
30 M M	30 M M	30 M M
1" Can	22 M M	28 M M & 22 M M
1 1/8" Beta Can	—	30 M M
3/4" Plastic Nozzle	3/4" Plastic Nozzle	Not Required

Note: Maximum dome thickness of plastic caps—
.090″ maximum +0
.070″ minimum —0

Note: Only three gasket sizes available.
28 M M gasket also fits 1″ can cap.
22 M M gasket also fits 24 M M caps.
30 M M gasket also fits 1 1/8″ Beta can cap.

Note: *Metal Caps*
Punched hole must be a perfectly flat, clean hole without curling.
No depressed edges or grooves can be tolerated on top surface of cap.

Die cut polyethylene gaskets—available.

Die cut elastomeric vinyl gaskets—available if requested.

550

[1219] DEFENDANT'S EXHIBIT 202.

Wise—Harnage Memos

CALMAR, INC.

W. H. HARNAGE
R. D. WISE

Cincinnati, Ohio
March 31, 1958
D. Corsette
R. Palmer

Dear Hal:

A list of major priorities for product development should be as follows, and this list should serve as the basis for our discussions the latter part of this week:

[1220] Page 2

March 31, 1958

To: W. H. Harnage

From: R. D. Wise

4. NEW LEAKPROOF SPRAYER

(a) Schedule for development.

(b) Samples for patent consideration.

(c) Trial tooling.

It is difficult to restrain my enthusiasm for this item. If successful, this is what we need to seize market initiative from our competitors next year. This entire program would have to be completed about the first of November.

DEFENDANT'S EXHIBIT 210

5551



CHART SHOWING WHEREIN

MECHANICAL ELEMENTS OF CLAIMS 1 & 2 OF SCOGGIN, JR. PATENT 2,870,943 ARE NOT FOUND IN PRIOR ART DEVICES

SCOGGIN, JR.
PATENT-IN-SUIT
2,870,943
1957-1959

Fig. 1.

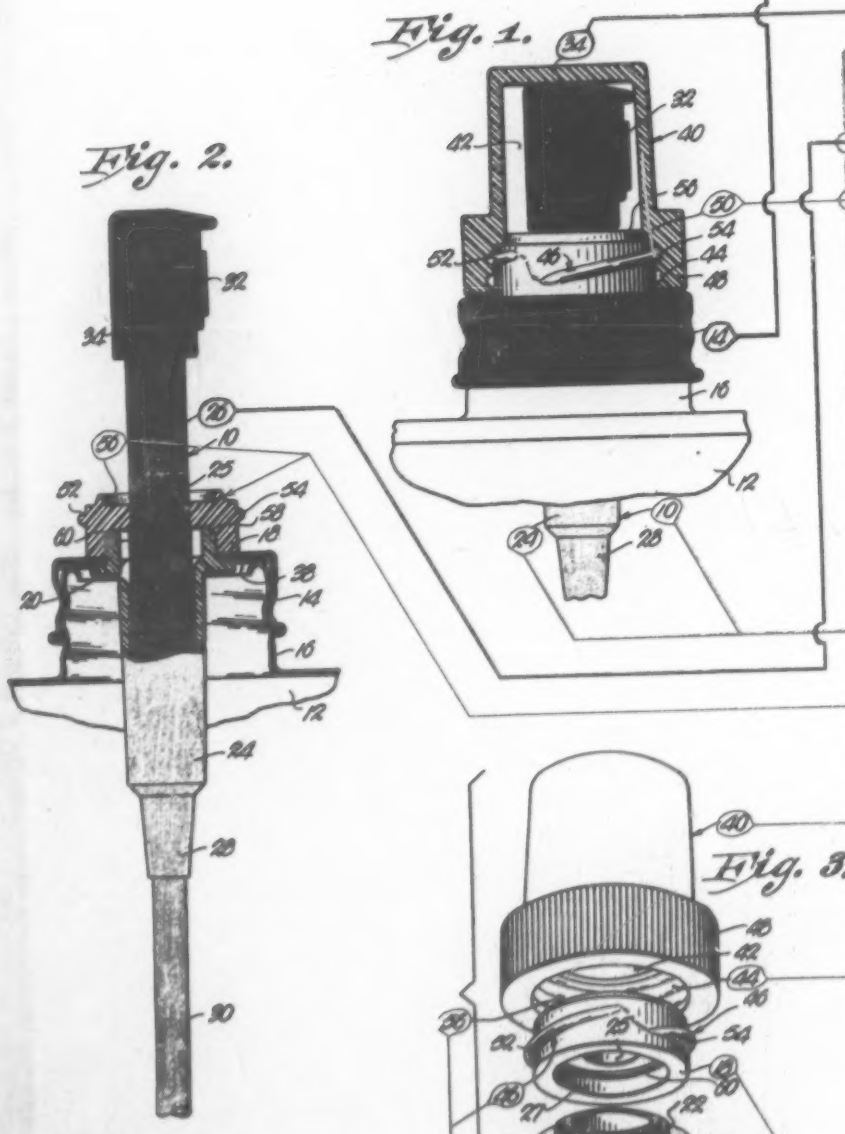


Fig. 2.

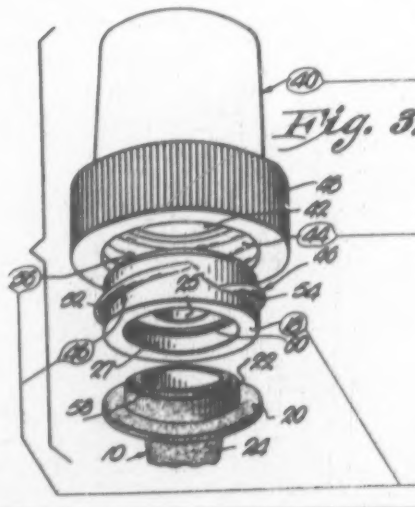


Fig. 3.

CLOSURE ASSEMBLY for LIQUID CONTAINER 12 (Colored Yellow)

CAP 14 (Colored Red)

SPRAYER 10 including BARREL 24 (Colored Flesh)

TUBULAR PLUNGER 26 (Colored Orange)

SPRAY HEAD 34 (Colored Brown)

RETAINER 18 (Colored Green) having SCREW THREADS 40 and ANNULAR RIB 56

HOLD DOWN MEMBER 60 (Colored Blue)

INTERNAL SCREW THREADS 64 (Colored Blue)

DOWNWARDLY FACING SHOULDER 59 (Colored Blue)

ANNULAR RIB 56 (Colored Green) has INCLINED OUTER ANNULAR FACE

ELEMENT NO.	MECHANICAL ELEMENTS OF SCOGGIN, JR. PATENT 2,870,943 As Described In CLAIM 1	CLAIM 2
INTRODUCTION A	IN A CLOSURE ASSEMBLY FOR AN OPEN-TOP CONTAINER HAVING	
B	A PERFORATED CAP OVER SAID OPEN TOP THEREOF MOUNTING	
C	A SPRAY UNIT INCLUDING A BARREL PROVIDED WITH A TUBULAR EXTENSION PASSING COAXIALLY UPWARDLY THROUGH THE PERFORATION IN SAID CAP.	
D	A PLUNGER RECIPROCABLY CARRIED BY THE BARREL AND NORMALLY EXTENDING THEREBEYOND AND	
E	A SPRAY HEAD ON THE UPPER END OF THE PLUNGER ABOVE SAID EXTENSION.	
1	THE COMBINATION WITH SAID SPRAY UNIT OF AN ANNULAR RETAINER TELESCOPED OVER AND SECURED TO THE EXTENSION ABOVE SAID CAP AND PROVIDED WITH EXTERNAL, CIRCUMFERENTIALLY DISPOSED SCREW THREADS AND AN ANNULAR, CONTINUOUS SEGMENT AT THE UPPER PART OF THE RETAINER ABOVE SAID SCREW THREADS, AND	A CLOSURE ASSEMBLY AS SET FORTH IN CLAIM 1 WHEREIN
2	A CUP-SHAPED HOLD-DOWN MEMBER HOUSING THE HEAD AND HOLDING THE PLUNGER DEPRESSED AT SUBSTANTIALLY THE INNERMOST PATH OF TRAVEL THEREOF WITHIN THE BARREL, SAID MEMBER BEING PROVIDED WITH	
3	INTERNAL SCREW THREADS COMPLEMENTALLY ENGAGING SAID SCREW THREADS ON THE RETAINER AND HAVING	
4	AN INTERNAL, CIRCUMFERENTIALLY EXTENDING, CONTINUOUS SHOULDER DISPOSED TO ENGAGE SAID SEGMENT AROUND THE ENTIRE PERIPHERY THEREOF AND THEREBY PRESENT A LIQUID-TIGHT SEAL LOCATED BETWEEN THE SPRAY HEAD AND SAID THREADS ON THE RETAINER AND SAID MEMBER RESPECTIVELY, SAID SHOULDER BEING SPACED FROM THE LOWER ANNULAR PERIPHERAL EDGE OF THE MEMBER A DISTANCE AT LEAST SLIGHTLY LESS THAN THE DISTANCE FROM THAT PORTION OF SAID SEGMENT NORMALLY ENGAGED BY SAID SHOULDER, TO THE PROXIMAL UPPER SURFACE OF THE CAP WHEREBY SAID LOWER EDGE OF THE MEMBER IS MAINTAINED OUT OF CONTACTING RELATIONSHIP WITH THE CAP WHEN THE MEMBER IS ON THE RETAINER IN A POSITION WITH SAID SHOULDER IN TIGHT SEALING ENGAGEMENT WITH THE SEGMENT.	
5		ONE OF THE NORMALLY INTERENGAGED SURFACES OF THE SHOULDER AND SEGMENT RESPECTIVELY IS SUBSTANTIALLY CONICAL TO PRESENT AN INCLINED ANNULAR FACE COAXIAL WITH THE MEMBER AND SAID RETAINER AND OF SUFFICIENT DIAMETER AT THE LARGEST END THEREOF TO CAUSE THE SEAL EFFECTED BETWEEN THE SHOULDER AND SAID SEGMENT TO BECOME TIGHTER AS THE SHOULDER SLIDES ON SAID SEGMENT DURING SHIFTING OF THE MEMBER TOWARD THE CAP.

RELIED UPON BY							
MOTHERSHEAD 2,714,974	JOHNSE 2,719,664	TORNBERG ET AL 2,834,975	MELLON 2,598,687	LIVINGSTONE 2,715,488	LIVINGSTONE 2,743,488	MELLON	
YES	YES	YES	YES	YES	YES	Y	
NO	YES	YES	YES	YES	YES	Y	
NO	NO	YES	NO	NO	NO	Y	
NO	YES	YES	YES	NO	NO	Y	
NO	YES	YES	YES	NO	NO	Y	
NO	NO	NO	NO	NO	NO		
NO	YES	NO	YES	NO ?	NO		
YES ?	YES	NO	NO	YES ?	YES ?		
NO	NO	NO	NO	NO	NO		
NO	NO	NO	NO	NO	NO	N	

OVERSIZE PAGE SEE NEXT FRAME

16

#3

5553

11

...F SCOGGIN, JR. PATENT

...T DEVICES

...R. PATENT 2,870,943

CLAIM 2

...URE ASSEMBLY AS SET FORTH IN
...

...WHEREIN

...OF THE NORMALLY INTERENGAGED
...FACES OF THE SHOULDER AND SEGMENT
...PECTIVELY IS SUBSTANTIALLY CONICAL
...PRESENT

...ARNED ANNULAR FACE

...KEAL WITH THE MEMBER AND SAID
...TNER AND

...SUFFICIENT DIAMETER AT THE LARGEST
...THEREOF TO CAUSE THE SEAL EFFECTED
...EEN THE SHOULDER AND SAID SEGMENT
...BECOME TIGHTER AS THE SHOULDER
...ES ON SAID SEGMENT DURING SHIFTING
...HE MEMBER TOWARD THE CAP.

IS ELEMENT FOUND IN PRIOR ART PATENTS																				
RELIED UPON BY DEFENDANT											FILE WRAPPER REFERENCES						OTHERS			
HOTHERSALL 1,714,874	LOHSE 2,119,884	TURNBULL ET AL 2,434,875	MELLON 2,580,687	LIVINGSTONE 2,715,480	LIVINGSTONE 2,763,402	MELLON 2,861,339	COOPRIDER ET AL 2,956,509			BIDDULPH 737,210 (Br.)	DARLEY, JR. 1,447,712	NILSON 2,116,222	LOHSE 2,119,884	MELLON 2,586,687	SLADE 2,844,290		MARTIN 2,362,080	STEWART ET AL 2,846,724			
YES	YES	YES	YES	YES	YES	YES	YES			YES	YES	YES	YES	YES	YES		YES	YES			
NO	YES	YES	YES?	YES	YES	YES?	YES			NO	YES?	NO	YES	YES?	YES		YES	YES			
NO	NO	YES	NO	NO	NO	YES?	YES			NO	NO	NO	NO	NO	NO		YES	YES			
NO	YES	YES	YES	NO	NO	YES	YES			NO	NO	NO	YES	YES	NO		YES	YES			
NO	YES	YES	YES	NO	NO	YES	YES			NO	NO	NO	YES	YES	NO		YES	YES			
NO	NO	NO	NO	NO	NO	NO	YES			NO	NO	NO	NO	NO	NO		NO	NO			
NO	YES	NO	YES	NO?	NO	YES	YES			NO	NO	NO	YES	YES	NO		NO	NO			
YES?	YES	NO	NO	YES?	YES?	NO	YES			NO	NO	NO	YES	NO	YES		NO	NO			
NO	NO	NO	NO	NO	NO	NO	YES			NO	NO	NO	NO	NO	NO		NO	NO			
NO	NO	NO	NO	NO?	NO?	NO	YES			NO	NO	NO	NO	NO	NO		NO	NO			

111

[fol. 555]

IN THE UNITED STATES COURT OF APPEALS

FOR THE EIGHTH CIRCUIT

Appeals from the United States District Court for the Western District of Missouri.

No. 17,540

CALMAR, INCORPORATED, Appellant,

v.

COOK CHEMICAL COMPANY, Appellee.

No. 17,541

COLGATE-PALMOLIVE COMPANY, Appellant,

v.

COOK CHEMICAL COMPANY, Appellee.

OPINION—August 21, 1964

Before Van Oosterhout, Ridge and Mehaffy, Circuit Judges.

MEHAFFY, Circuit Judge:

Appellants, Calmar, Incorporated and Colgate-Palmolive Company, brought separate actions for declaratory judgment against appellee, Cook Chemical Company, seeking a ruling of invalidity and noninfringement of United States [fol. 556] Patent No. 2,870,943 filed on March 4, 1957 and issued on January 27, 1959 to inventor Baxter I. Scoggin, Jr. Cook had acquired ownership of the patent and counterclaimed alleging its validity, infringement by both appellants and unfair competition on the part of Colgate. All

actions were consolidated for trial, but hearing on the unfair competition charge against Colgate was deferred pending the outcome of the issues of validity and infringement. Jurisdiction and existence of a justiciable controversy obtain. The District Court in an opinion published in 220 F.Supp. 414 found the patent valid and infringed, and we affirm.

The Scoggin patent in issue will be referred to as Cook-Bakan 2 and the accused device as Calmar SS-40. The undisputed factual background may be briefly recounted. Cook has been in the household insecticide business since 1945. Until 1947 Cook utilized metal sprayers as a dispenser for its product, trademarked "Real Kill", but in that year it first purchased newly developed plastic sprayers from Calmar as a sales promotion gimmick and attached them to the outside of its bottles of insecticide with a separate holder. Successful sales reaction to the idea necessitated its continued practice. Prior to 1956 Cook purchased its sprays from Calmar, but thereafter manufactured its own sprayers through a subsidiary, Bakan Plastics Company. In 1954 Colgate-Palmolive entered the household insecticide field with an aerosol container labeled "Kan Kill". In 1958 Colgate was marketing its "Kan Kill" in liquid, as well as aerosol, form, using a Calmar sprayer attached separately to a glass container, the combination of which resembled Cook's bottle of liquid "Real Kill" with accompanying Bakan sprayer. Marketing of both manufacturers' products [fol. 557] with separately attached plastic sprayers posed extra handling and expense problems. The bottler had to affix the cardboard or plastic holder on the neck of the bottle and insert therein the sprayer. More vexatious were the problems of breakage of the flimsily secured sprayer during shipment and pilfering while on the retailer's shelf. With the advance of the pressurized aerosol container, competition became acute due to the convenient shipment and use of the aerated sprayer, which required only that the housewife remove the sprayer cap and depress a button releasing the gasified insecticide. The liquid insecticide makers were

aware of their product's shipping and operation shortcomings, and plagued by the apparent need for a container with an integrated sprayer-pump which could be safely shipped without breakage or leakage. Despite the extensive research and experimentation given the problem by Calmar, Cook and others for a period of some ten years, no solution was forthcoming until conception and commercialization of the Cook-Bakan 2, described by its inventor as a "Pump-Type Liquid Sprayer Having Hold-Down cap".

The sprayer pump, although not the patentable device in suit, has as its upper element, a head containing an orifice, connected with an internal pump through which a dip tube extends to the liquid in the container below. When the sprayer head is depressed, the pump is actuated and causes the liquid in spray form to be emitted.

It was a simple matter to incorporate the sprayer in the container rather than employ the ordinary non-perforated cap with sprayer separately attached, but such an arrangement did not lend itself to shipping because the sprayer would accidentally pump the liquid out in transit. The sprayer head had to be combined and shielded with some type of overcap which maintained the plunger in a [fol. 558] depressed position minimizing leakage from the pump of the low viscous insecticide or other similar liquids, while retaining any such leakage within the overcap through a liquid-tight seal until the cap was removed and the product put into use by the consumer.

Scoggin described his answer to these liquid manufacturers' dilemma in the specifications of his patent application as an invention relating to "improvements in structures for dispensing liquids wherein is provided a spray-type hand pump mounted within a container for the liquid through use of the closure cap of such container". Of the four claims on which the Patent Office granted the patent, we are concerned only with Claims 1 and 2.[1]

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[1] Claim 1. "In a closure assembly for an open-top container having a perforated cap over said open top thereof mounting a spray unit including a barrel provided with a tubular extension

The object of the patent is to eliminate the old outside attached sprayer and supplant it with a sprayer enclosed [fol. 559] in the container in such a fashion that the sprayer head will be depressed, protected, and sealed in order that the product would lend itself to transportation and handling without breakage or leakage. Claim 1 described a completely integrated device which assertedly accomplished this purpose by the assemblage of corresponding internal threads in the over-cap which screw onto corresponding exteral threads of the sprayer head's collar with an allowance for a space between the lower edge of the over-cap and the container cap to insure a torqued fit. The

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passing coaxially upwardly through the perforation in said cap, a plunger reciprocally carried by the barrel and normally extending therebeyond and a spray head on the upper end of the plunger above said extension, the combination with said spray unit of an annular retainer telescoped over and secured to the extension above said cap and provided with external, circumferentially disposed screw threads and an annular, continuous segment at the upper part of the retainer above said screw threads, and a cup-shaped hold-down member housing the head and holding the plunger depressed at substantially the innermost path of travel thereof within the barrel, said member being provided with internal screw threads complementally engaging said screw threads on the retainer and having an internal, circumferentially extending, continuous shoulder disposed to engage said segment around the entire periphery thereof and thereby present a liquid-tight seal located between the spray head and said threads on the retainer and said member respectively, said shoulder being spaced from the lower annular peripheral edge of the member a distance at least slightly less than the distance from the portion of said segment normally engaged by said shoulder, to the proximal upper surface of the cap whereby said lower edge of the member is maintained out of contacting relationship with the cap when the member is on the retainer in a position with said shoulder in tight sealing engagement with the segment."

Claim 2. "A closure assembly as set forth in claim 1 wherein one of the normally interengaged surfaces of the shoulder and segment respectively is substantially conical to present an inclined annular face coaxial with the member and said retainer and of sufficient diameter at the largest end thereof to cause the seal effected between the shoulder and said segment to become tighter as the shoulder slides on said segment during shifting of the member toward the cap."

over-cap, while holding the sprayer head depressed, also provides for a seal resulting from a raised annular rib around the top of the collar engaging the periphery of three surfaces formed by a downwardly facing shoulder on the underside of the over-cap above the threads. An expert testifying on behalf of appellee described the device's novel contribution to the industry as:

> "The first commercially successful, inexpensive integrated shipping closure pump unit which permitted automated assembly with a container of household insecticide or similar liquids to produce a practical, ready-to-use package which could be shipped without external leakage and which was so organized that the pump unit with its hold-down cap could be itself assembled and sealed and then later assembled and sealed on the container without breaking the first seal."

Validity of the Patent. The statute provides that a patent shall be presumed valid and the burden of establishing invalidity rests on the party asserting it. 35 U.S.C.A. § 282. The issue of patentability of a new combination of old elements to form invention must, however, be approached keeping in mind the more exacting standard long required by the Supreme Court. In *Selmix Dispensers, Inc.* v. *Multi-*
[fol. 560] *plex Faucet Co., Inc.*, 277 F.2d 884 (8th Cir. 1960), we recognized the Supreme Court's admonition in *Great Atlantic and Pacific Tea Co.* v. *Super-Market Equipment Corp.*, 340 U.S. 147, 152 (1950) that "The conjunction or concert of known elements must contribute something; only when the whole in some way exceeds the sum of its parts is the accumulation of old devices patentable." See also *Cuno Engineering Corp.* v. *Automatic Devices Corp.*, 314 U.S. 84, 90 (1941); *Lincoln Engineering Co.* v. *Stewart-Warner Corp.*, 303 U.S. 545, 549 (1938); *Caldwell* v. *Kirk Mfg. Co.*, 269 F.2d 506 (8th Cir. 1959), cert. denied 361 U.S. 915 (1959); *Briggs & Stratton Corp.* v. *Clinton Machine Co., Inc.*, 247 F. 2d 397 (8th Cir. 1957), cert. denied 355 U.S. 914 (1958).

Factual comparison of the individual elements of the Cook-Bakan 2 sprayer unit with prior art would permit a finding that its components are not novel per se—threaded over-cap depressing sprayer head (Lohse Pat. No. 2,119,884); complementary threaded collar (Lohse Pat. No. 2,119,884; Darley Pat. No. 1,447,712); space tolerance between over-cap and container cap (Slade Pat. No. 2,844,290; Livingston Pat. No. 2,715,480); and shoulder-rib seal at zone beneath sprayer head and above threads (Mellon Pat. No. 2,586,687). However, there is nothing in the prior art suggesting Scoggin's unique combination of these old features in such an assemblage as would solve the production, shipping, and operation problems which for years beset the insecticide industry as well as producers of other low viscous liquids. The patentee's "closure assembly" eliminated the costly and time consuming steps in production requiring attachment of the sprayer holder to the outside of the container and insertion of the sprayer, while at the same time providing a protected, sealed [fol. 561] sprayer unit which need only be screwed onto the top of the insecticide container like a metal cap, not to be disturbed until removal of the over-cap and application by the ultimate consumer. This novel "marriage" of the sprayer with the insecticide container which took years in the discovery is neither taught by, nor readily discernible from the application of mechanical skill to the elements of the prior art.

Not only did the device produce new and useful results in the more efficient and economical bottling of low viscous liquids while simultaneously eliminating breakage and leakage during its shipment and storage, but it enjoyed immediate commercial success from the public. Cook used on its own products or sold to customers some fifteen million of the Cook-Bakan 2 sprayers receiving not over one hundred complaints which is negligible when dealing with an item packaged by mass production techniques. Evidence of commercial success in a doubtful case may turn the scale in favor of the patentee. *Long* v. *Arkansas Foundry*

Co., 247 F.2d 366, 369 (8th Cir. 1957). Instantaneous industry, as well as public acceptance of the device in issue confirms our belief invention was produced.

In short, the Cook-Bakan 2 meets the exacting standard required for a combination of old elements to rise to the level of patentable invention by fulfilling the long-felt need with an economical, efficient, utilitarian apparatus which achieved novel results and immediate commercial success. Unquestionably, the trial court's finding something new was created worthy of patent protection was proper.

Infringement. After the Cook-Bakan 2 was marketed, some of Calmar's larger customers solicited it to produce [fol. 562] a leak-proof, integrated sprayer. At that time Calmar was distributing an uncovered, lock-down bayonet slot type sprayer, the S-25-LP, which proved so unsatisfactory in retaining products of the liquidity of insecticides that one of Calmar's officials discouraged promotion of the item by its sales force. Calmar also experimented with a polyethylene boot, resembling an elongated balloon, which was inserted in the container and covered the lower extremity of the sprayer pump to prevent leakage. Colgate, a customer of Calmar, rejected this innovation and expressed preference for something similar to the Cook-Bakan 2 in appearance which would provide an internally leak-proof sprayer in addition to a shipping enclosure for the sprayer head. Calmar was notified by another customer that it had a Cook-Bakan 2 on test which had proven not to leak. During the fall of 1957 continued pressure from other customers beleaguering Calmar to produce a truly leak-proof integrated sprayer prompted Calmar's president to employ engineer Douglas F. Corsette in December of 1957, assigning him the special mission of designing such a sprayer which would satisfy customer demands and recapture market initiative.

On September 9, 1958, subsequent to commercialization of the Cook-Bakan 2 in 1957, application was made for a patent on the accused device, Calmar SS-40. Production and distribution of the accused device immediately fol-

lowed Calmar's grant of United States Patent No. 2,956,509 on October 18, 1960.

The challenged features of the alleged infringing Calmar SS-40, the combination of collar to cap seal with attendant hold-down of the sprayer head, are identical with respect to the sealing zone, principle, and purpose of the Cook-Bakan 2 and differs only in the shape or form of the [fol. 563] sealing surfaces at the collar to cap engagement.[2] The trial court correctly described this uncontrolling difference in shape of the seal as the employment of a square shoulder-to-rib type seal on the Cook-Bakan 2 opposed to a tongue-and-groove or "labyrinth" seal on the accused device. The Cook-Bakan 2 provides for three contacting sealing surfaces, whereas the tongue-and-groove shape of the Calmar SS-40 provides for four contacting surfaces. The practical effect of the accused device was to perform substantially the same function in substantially the same manner to obtain the same result as the patent in issue. Exercising our appellate prerogative in a patent case to interpret the exhibits for ourselves, we are constrained to agree with the trial court's statement that "Upon close inspection of the devices, it is difficult to see how they could be much more similar and yet have any different features".

Appellants assert error on the part of the trial court in basing its conclusion of infringement on comparison of the devices rather than comparing the accused device with the claims of the patent in suit which they maintain bespeak dissimilarity. The record, however, affords specific evidence of the similarity of the accused device with elements described in Claims 1 and 2 of the Cook-Bahan 2 patent. Testifying at length concerning the elements and patent claims of both devices, a highly qualified expert witness for appellee stated that it was his opinion each and every one of the mechanical elements outlined in Claims 1 and 2

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[2] The accused device also utilized "inner seals" in the pump mechanism uninvolved in this litigation.

of the Cook-Bakan 2 finds a response in the structure of the accused Calmar SS-40 sprayer unit. The Supreme Court held in *Sanitary Refrigerator Co.* v. *Winters,* 280 [fol. 564] U.S. 30 (1929) that generally one device is an infringement of another if it performs substantially the same function in substantially the same way to obtain the same result even though they differ in name, form, or shape. See also *Graver Tank Mfg. Co., Inc.* v. *Linde Air Products Co.,* 339 U.S. 605, 608 (1950); *Priebe & Sons Co.* v. *Hunt,* 188 F. 2d 880, 883-84 (8th Cir. 1951), petition for cert. dismissed 342 U.S. 801 (1951). The accused device falls within this definition prohibiting substantial equivalence since its basic mechanical elements, mode of operation, and results obtained find an identical counterpart described in the pertinent claims of the Cook-Bakan 2, the two devices varying only with respect to the inconsequential shape of the sealing surfaces.

The finding of infringement in the instant case based on the doctrine of substantial equivalence is a factual determination. *Graver Tank Mfg. Co., Inc.* v. *Linde Air Products Co., supra* at 609; *Maytag Co.* v. *Murray Corp. of America,* 318 F.2d 79, 83 (6th Cir. 1963). Substantial evidence supports the trial court's finding of infringement.

The judgment of the District Court is in all things affirmed.

[fol. 565]

IN THE UNITED STATES COURT OF APPEALS

FOR THE EIGHTH CIRCUIT

September Term, 1963

No. 17540

CALMAR, INCORPORATED, Appellant,

vs.

COOK CHEMICAL COMPANY.

Appeal from the United States District Court for the Western District of Missouri,

and

No. 17541

COLGATE-PALMOLIVE COMPANY, Appellant,

vs.

COOK CHEMICAL COMPANY.

Appeal from the United States District Court for the Western District of Missouri.

JUDGMENT—August 21, 1964

These causes came on to be heard on the record from the United States District Court for the Western District of Missouri, and were argued by counsel.

On Consideration Whereof, It is now here Ordered and Adjudged by this Court that the judgment of the said District Court in these causes (District Court Nos. 12349-3 and 13006-3) be, and the same is hereby, affirmed.

August 21, 1964.

[fol. 566] [File endorsement omitted]

IN THE UNITED STATES COURT OF APPEALS

FOR THE EIGHTH CIRCUIT

Appeal Numbers 17,540 and 17,541 Civil

CALMAR, INC. and COLGATE-PALMOLIVE CO.,
Plaintiffs-Appellants,

v.

COOK CHEMICAL COMPANY, Defendant-Appellee.

PETITION OF APPELLANTS FOR REHEARING EN BANC UNDER THIS COURT'S RULE 15—Filed September 29, 1964

[fol. 567]

TABLE OF CONTENTS

PAGE

I. The Court Overlooked Conflict between Panels of this Court 567

II. The Court Overlooked the Fact that the Presumption of Validity Has No Support 570

III. The Court Overlooked the Absence of Commercial Success of a Kind Requisite to Support the Validity of the Patent in Suit 572

IV. The Court Overlooked the Fact that the Proofs Fail to Show that the Patent in Suit Fulfilled a Long Felt Need 573

V. The Court Overlooked the Fact that the Cap-to-Collar Seal and the Conventional Spray Pump Operate separately and independently of Each Other 574

Certificate of Counsel Under Eighth Circuit Rule 15(a) 576

TABLE OF CASES

Cuno Engineering Corp. v. Automatic Devices Corp., 314 U.S. 84, 90 (1941) 568

John Deere Company of Kansas City et al. v. Graham et al., 333 F. 2d 529 (1964); 142 USPQ 243 567

Great Atlantic and Pacific Tea Co. v. Super-Market Equiment Corp., 340 U.S. 147, 152 (1950) 567-68

Lincoln Engineering Co. v. Stewart-Warner Corp., 303 U.S. 545, 549; 82 L. Ed. 1008, 1010; 58 S. Ct. 662 575

Neff Instrument Corp. v. Cohn Electronics, Inc., 298 F. 2d 82, 86 (C.A. 9, 1961) 570

Patterson-Ballagh Corp. v. Moss et al., 201 F. 2d 403, 406 (C.A. 9, 1953) 570

Western Pac. R. Corp. et al. v. Western Pac. R. Co., et al., 345 U.S. 247, l.c. 270; 73 S. Ct. 856, l.c. 668 570

Williams Mfg. Co. v. United Shoe Mach. Corp., 121 F. 2d 273, 277 (C.A. 6, 1941) 570-71

[fol. 568]

IN THE UNITED STATES COURT OF APPEALS

FOR THE EIGHTH CIRCUIT

Appeal Numbers 17,540 and 17,541 Civil

CALMAR, INC. and COLGATE-PALMOLIVE CO.,
Plaintiffs-Appellants,

v.

COOK CHEMICAL COMPANY, Defendant-Appellee.

Petition of Appellants for Hehearing En Banc Under This Court's Rule 15

Appellants Calmar, Inc. and Colgate-Palmolive Company respectfully pray this Court to grant a rehearing *en banc* of this Court's decision of August 21, 1964 on the points herein stated, under Rule 15(e) of the Rules of this Court. By order of the Court dated August 26, 1964, the time within which to file this petition was extended to September 30, 1964.

[fol. 569]

I.

The Court Overlooked Conflict Between Panels of This Court

In its determination of validity of the Scoggin patent in suit, the Court has overlooked or failed to give due weight to this Court's opinion in the case of *John Deere Company of Kansas City et al.* v. *Graham et al.*, decided June 18, 1964, 333 F. 2d 529 (1964), wherein on a factual situation essentially parallel to that of the case at bar* another panel of this Court reached a directly contrary conclusion, relying on, among other authorities, *Great Atlantic and Pacific Tea Co.* v. *Super-Market Equipment Corp.*, 340 U.S. 147,

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* For the facts in the *John Deere* case see the District Court's opinion and findings, 216 F. Supp. 272.

152 (1950) and *Cuno Engineering Corp.* v. *Automatic Devices Corp.*, 314 U.S. 84, 90 (1951).

The Court, in defining appellee's "novel contribution to the industry" (Opinion p. 5), not in terms of the actual claims in suit but *in hypothetical terms supplied by appellee's expert** and quoted in full on page 5 of its opinion, overlooked the fact that in the patent claims, which measure the grant to the patentee, nothing is mentioned about the steps followed in *assembling* the elements of the "closure assembly" or the sequence of steps, and that the claims are silent as to combining the sprayer with a container for household insecticide or low viscous liquids, i.e., the "marriage" emphasized by the Court (Opinion p. 7), and that the panel deciding the *John Deere* case, supra, said (page 534):

> "Additionally, it is significant that in the 798 Patent claims, nothing is mentioned about the shank flex which [fol. 570] became the basic reason for sustaining the validity of the patent in the trial court. To be sure, it is the claim that measures the grant to the patentee, Briggs & Stratton Corporation v. Clinton Machine Co., supra, 247 F.2d at 400, and here the claims of the 798 Patent are silent concerning the alleged flex. * * *"

The Court overlooked and failed to give due weight to the fact that appellees acknowledged the base combination of the patent in suit to be old and cancelled as unpatentable some nineteen claims thereto, including application Claim 18 (R. 363); that apart from the Court's reference to "low viscous liquids", as to which the claims of the patent in suit are silent, the "unique combination" and the "new and useful results" attributed by the Court to the pat-

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* ". . . [a] closure pump unit which permitted automated assembly with a container of household insecticide or similar liquids . . . which was so organized that the pump unit with the hold-down cap could be itself assembled and sealed and then later assembled and sealed on the container without breaking the first seal" (Opinion p. 5).

ent in suit are the old combination and old results expressly taught by Lohse patent 2,119,884* (Exh. T, R. 407, 408) and that at best the improvement combination of the patent in suit produces an old result in a cheaper and otherwise more advantageous way (or in a "more efficient and economical" way (Opinion p. 7) and involves no new principle.**

[fol. 571] In holding the patent in suit valid on the ground that it provided "an economical, efficient, utilitarian apparatus" (Opinion p. 7), the Court overlooked the distinction between the rule of the Fifth Circuit respecting an improvement combination, which was apparently adopted in the instant case, and the rule enunciated by a different panel of this Court in the *John Deere* case, supra (p. 533), where the Fifth Circuit rule is rejected in the following language:

> "* * * Unlike our court, the Fifth Circuit has 'long recognized * * * that an improvement combination is patentable even though its constituent elements are singly revealed by the prior art, where * * * it produces an *old result in a cheaper and otherwise more advantageous way*' (emphasis supplied), 219 F. 2d at

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* "This invention relates to liquid sprayers of the general type used for spraying liquids upon windows, house plants, clothing and for other purposes and is intended to provide simple and effective means for economically performing its functions while also making provision for convenient and *safe transportation when filled,* or partly filled, with liquid *without danger of leakage* of the contents.

"With these objects in view the invention comprises a bottle closure removably attachable to a bottle or other container and provided with a movable plunger piston and a liquid chamber, the closure being provided with *removable sealing means which serves both to prevent leakage of the liquid content to the outside and to retain the plunger in a depressed position* to avoid the filling of the outlet conduit which forms a hollow stem for the piston." (Paragraphs 1 and 2 of Lohse specification—R. 408.) (Emphasis supplied.)

** "A new application of an old device may not be patented if the 'result claimed as new is the same in character as the original result' . . . even though *the new result* had not before been contemplated . . ." (*Cuno Engineering,* supra, at 91.) (Emphasis supplied.)

519. For other recognition by the Fifth Circuit of the 'old result in a more efficient and economical way' see, Cornell v. Adams Engineering Company, supra, 258 F. 2d at 875-876."

Further, in bringing this case under the exception noted in *Great A. & P.* v. *Super-Market, supra,* in which it is suggested that an "accumulation of old devices" may be patentable "when the whole in some way exceeds the sum of its parts" (Opinion p. 6), this Court overlooked its own interpretation of the exception, expressed in the *John Deere* case, supra (p. 533):

"* * * Stated differently, 'The bringing together of old elements in a mechanism involving *no new principle, to produce an old result, however skillfully done, even though the result marks an advance in efficiency and utility,* is but an exercise of mechanical skill and not invention.' General Bronze Corp. v. Cupples Products Corp., 8 Cir. 189 F. 2d 154, 161 (1951)." (Emphasis supplied.)

As stated in the concurring opinion of Justice Frankfurter in *Western Pac. R. Corp. et al.* v. *Western Pac. R. Co., et al.,* 345 U.S. 247, l.c. 270; 73 S. Ct. 856, l.c. 668:

"Rehearings *en banc* by these courts are to some extent necessary in order to resolve conflicts between panels. This is the dominant concern."

[fol. 572] II.

The Court Overlooked the Fact That the Presumption of Validity Has No Support

The patent in suit was accorded the statutory presumption of validity (Opinion p. 5). That presumption "is based upon the expertness of the Patent Office," *Neff Instrument Corp.* v. *Cohn Electronics, Inc.,* 298 F. 2d 82, 86 (C.A. 9, 1961). See also *Patterson-Ballagh Corp.* v. *Moss et al.,* 201 F. 2d 403, 406 (C.A. 9, 1953) and *Williams Mfg.*

Co. v. *United Shoe Mach. Corp.*, 121 F. 2d 273, 277 (C.A. 6, 1941). The Livingstone 2,715,480 (R. 385) and Turnbull 2,434,875 (R. 419) patents were not before the Patent Office

Here the Court overlooked the fact that, after Scoggin's Claims 1-17 were rejected by the Examiner, and together with Claims 18-24 were withdrawn by appellee's attorney (R. 365, next to last paragraph and R. 370), the final limiting clause of Claim 1 of the patent (Claim 25 of the application, R. 370), inserted by amendment to define novelty over the prior art by agreement between the Patent Office and the patentee's attorney, as shown in the file history of the patent (R. 371, 372),* was found by the District Court (R. 26, 27) to be "descriptive of an element of the patent, but not a part of the invention" and "not new or novel", thereby holding that the sole claim to novelty or invention [fol. 573] relied upon by the expertness of the Patent Office in granting the patent did not constitute either novelty or invention.

The Court thus overlooked the fact that no basis now exists for the presumption of validity, as the expertness of the Patent Office in the instant case stands negated by the findings of the trial court and was not exercised as to the patents to Livingstone and Turnbull.

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*In the amendment cancelling Claim 18 and presenting Claim 25 (Claim 1 of the patent), applicant's attorney said (R. 371):

"During the subject interview, the Honorable Examiner cited two additional patents not previously of record in the prosecution of this application and which were believed to be pertinent as to the allowability of Claims 18 and 19, presented in applicant's response of November 1, 1958. . . .

"These new patents were carefully studied during the interview and *agreement was reached between the Honorable Examiner and applicant's attorney relative to limitations which must be in the claims in order to define novelty* over the previously applied disclosure of Lohse when considered in view of the newly cited patents of Mellon and Darley, Jr." (Emphasis supplied.)

III.

The Court Overlooked the Absence of Commercial Success of a Kind Requisite to Support the Validity of the Patent in Suit

The Court overlooked the fact that during 1958, Cook's first year of marketing insecticide in a container equipped with the "closure assembly" of the patent in suit, no other insecticide container equipped with a "closure assembly" was being marketed; that Colgate's insecticide is "still sitting in the shelves, because it was insecticide that had the sprayer hanging on the side of the bottle" (R. 69); that nevertheless Cook in that year was unable to sell any more insecticide or to sell or give away any more sprayer assemblies, than in the previous year when it employed the earlier sprayer hung on the outside of the container (R. 62).

The Court also overlooked the fact that the seal of the single embodiment of the patent constituting the consideration for its grant is subject to distortion and leakage (Exh. AD, R. 506, 507) and constitutes a step backward in the art of "integrated closure assemblies" from the overcap seals of the Lohse (Exh. T, R. 407) and Mellon (Exh. U, R. 410) patents, employing conventional gasket seals, and the superior molded plastic overcap-to-collar seal of the Livingstone patent 2,715,480, Figure 8 (R. 385). The Court additionally overlooked and neglected to give due weight to the documentary evidence (Exh. C, R. 341) establishing that in November 1959, less than ten months after the patent in suit issued on January 27, 1958, the imperfect [fol. 574] seal of the appellee's Bakan 2, corresponding to the disclosure of the patent, was re-engineered and redesigned as Bakan 2 Modified to employ a seal essentially like the overcap-to-collar seal of the Livingstone patent, Figure 8 (Exh. JJ, R. 455), of the kind previously adopted by appellant Calmar (R. 65, Exh. QQ, R. 475), and that appellee thereupon discontinued the production of the seal disclosed and claimed in the patent in suit (Exh. C, R. 341 last paragraph).

IV.

The Court Overlooked the Fact That the Proofs Fail to Show That the Patent in Suit Fulfilled a Long Felt Need

The Court in holding (p. 7):

> ". . . the Cook-Bakan 2 meets the exacting standard required for a combination of old elements to rise to the level of patentable invention by fulfilling the long-felt need . . ."

overlooked the fact that the patent in suit makes no provision against leakage into the cap (R. 265) and that the need even in the insecticide industry was not for a mere hold-down cap that would depress the sprayer and provide a *cap seal* against leakage of liquid from the cap, which need was fulfilled by Lohse and Mellon, but that the long felt need, recognized in appellee's later filed patent application Serial No. 789,902 (Ex. AD, R. 504),* was for spray *pump seals* that would prevent liquid from passing from the pump into the overcap and which would thus pro- [fol. 575] vide a truly leakproof integrated sprayer (R. 305-307). The Court additionally overlooked the fact that the patent in suit goes no further than Lohse and Mellon had previously gone in providing a mere hold-down cap to depress the sprayer and seal against leakage *from the cap* (R. 265) and the fact that the cap seal of the patent in suit was admittedly imperfect (Ex. AD, R. 506, 507).

The Court overlooked and failed to give due weight to the fact that the long felt need was first fulfilled by the

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* The later application asserted:

> "An additional important object of the invention is to provide a sealing member capable of maintaining the liquid within . . . the pump, whereby liquid is prevented from passing *into* the hold-down cap . . . it being recognized that the hold-down cap tends to become distorted when the same is tightly screwed on the retainer . . . and which distortion oftentimes permits liquid to leak from the liquid sprayer . . ." (R. 506, 507). (Emphasis supplied.)

leakproof *pump seals* of the Calmar SS-40 (R. 66, 306) which Cook adopted after abandoning the imperfect *cap seal* of the patent in suit (Ex. C, R. 341, last paragraph, and R. 154, 156).

V.

The Court Overlooked the Fact That the Cap-to-Collar Seal and the Conventional Spray Pump Operate Separately and Independently of Each Other

The Court in stating at page 7 of the Opinion,

> "This novel 'marriage' of the sprayer with the insecticide container which took years in the discovery is neither taught by nor readily discernible from the application of mechanical skill to the elements of the prior art,"

overlooked or failed to give due weight to the fact that the "marriage" of the dispenser with the container is common to Lohse, Livingstone, and Mellon, and that the Mellon patent 2,586,687 (Exh. U, R. 410) discloses the identical "marriage" of the sprayer with the *insecticide* container, stating specifically that the device is "to spray liquid *insecticides*" (R. 411, col. 1, line 8).

The Court overlooked the fact that in the device of the patent in suit the cap-to-collar seal in no way cooperates with or modifies the operation of the admittedly old spray pump and is just as effective whether the pump is in the collar or is absent, that the old spray pump in no way cooperates with or modifies the cap-to-collar seal, that when [fol. 576] one is in use, the other is necessarily inoperative, that neither performs any new or different function or operation than that theretofore separately performed by them, and that the claims in suit call only for the mere aggregation of a cap-to-collar seal, old in the art as shown by the superior cap-to-collar seal of the Livingstone closure assembly, with the admittedly old spray pump and are

therefore invalid under *Lincoln Engineering Co.* v. *Stewart-Warner Corp.*, 303 U.S. 545, 549; 82 L. Ed. 1008, 1010; 58 S. Ct. 662, holding:

> "The mere aggregation of a number of old parts or elements which, in the aggregation, perform or produce no new or different function or operation than that theretofore performed or produced by them is not patentable invention."

Additionally, the Court overlooked the fact that its decision herein forecloses the public from its right to use the overcap and the overcap-to-collar seal of the antecedent Livingstone patent 2,715,480 to depress, house and *seal* the admittedly old spray pump as taught in Lohse patent 2,119,884, and confers upon appellee a monopoly of that right to use an antecedent invention.

To the end that Justice may be done in this cause, a rehearing by the Court sitting *en banc* is respectfully solicited.

For Calmar, Inc.:

Francis G. Cole, James P. Burns, Washington, D. C. 20005.

William H. Curtis, Kansas City, Missouri 64106.

For Colgate-Palmolive Co.:

Howard A. Crawford, Kansas City, Missouri 64105.

[fol. 577]

APPENDIX

UNITED STATES COURT OF APPEALS

FOR THE EIGHTH CIRCUIT

No. 17,540

CALMAR, INC., Appellant,

v.

COOK CHEMICAL COMPANY, Appellee.

No. 17,541

COLGATE-PALMOLIVE COMPANY, Appellant,

v.

COOK CHEMICAL COMPANY, Appellee.

CERTIFICATE OF COUNSEL UNDER EIGHTH CIRCUIT RULE 15(a)

It is hereby certified that the petition for rehearing in the above cause is submitted in good faith and believed by counsel and petitioners to be meritorious.

Attorneys for Calmar, Inc.:

William H. Curtis, Kansas City, Missouri.
Francis G. Cole, Washington, D. C.
James P. Burns, Washington, D. C.

Attorney for Colgate-Palmolive Company:

Howard A. Crawford, Kansas City, Missouri.

[fol. 578]

IN THE UNITED STATES COURT OF APPEALS

FOR THE EIGHTH CIRCUIT

September Term, 1964

No. 17540

No. 17541

[Titles omitted]

ORDER DENYING PETITION OF APPELLANTS FOR REHEARING EN BANC—October 9, 1964

There is before the Court appellants' petition for rehearing en banc and on consideration of such petition, It is the Order of the Court that the petition for rehearing en banc be, and it is hereby, denied.

[fol. 579]

IN THE UNITED STATES COURT OF APPEALS

FOR THE EIGHTH CIRCUIT

September Term, 1964

No. 17540

No. 17541

[Titles omitted]

ORDER DENYING MOTION OF APPELLANTS TO RECALL AND STAY ISSUANCE OF MANDATE—November 9, 1964

The Court has considered appellants' motion to recall mandate and for stay of mandate, and it now here ordered that the said motion be, and it is hereby, denied.

[fol. 580]

CLERK'S CERTIFICATE

UNITED STATES COURT OF APPEALS

FOR THE EIGHTH CIRCUIT

I, Robert C. Tucker, Clerk of the United States Court of Appeals for the Eighth Circuit, do hereby certify that the foregoing contains the two volume printed record on which the appeals from the United States District Court for the Western District of Missouri were heard and determined in said Court of Appeals, together with volume of the proceedings in said Court of Appeals consisting of full, true and complete copies of the Opinion and Judgment entered on August 21st, 1964; Petition of appellants for a rehearing en banc and Order denying same, and Order of said Court of Appeals denying Motion of appellants to recall and stay issuance of mandate, in the cases of Calmar Incorporated, Appellant vs. Cook Chemical Co., and Colgate-Palmolive Company, Appellant vs. Cook Chemical Co., Nos. 17540 and 17541, as full, true and complete as the originals thereof remain on file and of record in my said office.

I do further certify that on the 20th day of October, A. D. 1964, a Mandate was issued out of said Court of Appeals in said causes, directed to the United States District Court for the Western District of Missouri.

In Testimony Whereof, I hereunto subscribe my name and affix the seal of the United States Court of Appeals for the Eighth Circuit, at office in the City of St. Louis, Missouri, this ninth day of November, A. D. 1964.

(Seal)

Robert C. Tucker, Clerk of the United States Court of Appeals for the Eighth Circuit.

[fol. 581]

SUPREME COURT OF THE UNITED STATES

No. 778, October Term, 1964

CALMAR, INC., Petitioner,

v.

COOK CHEMICAL COMPANY.

ORDER ALLOWING CERTIORARI—March 29, 1965

The petition herein for a writ of certiorari to the United States Court of Appeals for the Eighth Circuit is granted. The case is consolidated with No. 810 and one hour is allotted for oral argument for both cases. The cases are set for argument immediately following No. 580.

And it is further ordered that the duly certified copy of the transcript of the proceedings below which accompanied the petition shall be treated as though filed in response to such writ.

[fol. 582]

SUPREME COURT OF THE UNITED STATES

No. 810, October Term, 1964

COLGATE-PALMOLIVE COMPANY, Petitioner,

v.

COOK CHEMICAL COMPANY.

ORDER ALLOWING CERTIORARI—March 29, 1965

The petition herein for a writ of certiorari to the United States Court of Appeals for the Eighth Circuit is granted. The case is consolidated with No. 778 and one hour is allotted for oral argument for both cases. The cases are set for argument immediately following No. 580.

And it is further ordered that the duly certified copy of the transcript of the proceedings below which accompanied the petition shall be treated as though filed in response to such writ.